AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

THE HOUSING ACT and H O L C

A resume of the new legislation; how the laws will function; explanation of procedure you can pass along to your prospects

See pages 11 to 17

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JULY
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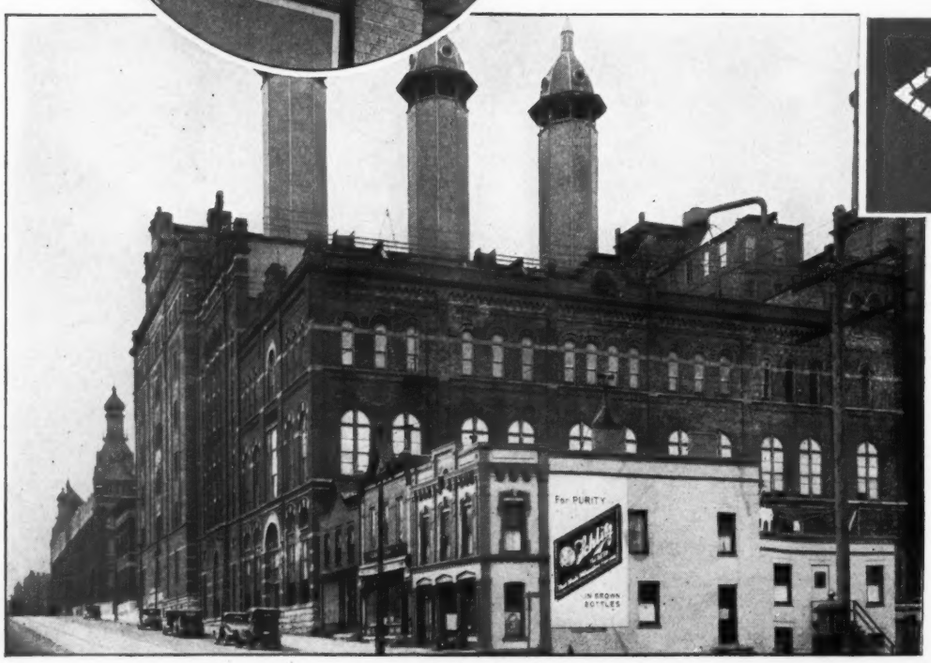

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Controls, Equipment, Hook-ups

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Every unit sold sells the other units—multiplies your volume and profit. Briefly these units are:

UNIT NUMBER		FACTORY LIST PRICE
1	**THE HOLD HEET SYSTEM** ('Improved "Automatic Heat")	$ 29.50
2	**HOLD HEET Automatic Humidity** (for entire house)	35.20
3	**HOLD HEET Air Conditioning** (filters air and forces heat distribution)	112.50
4	**HOLD HEET GIANT NITE FAN** (Cools the entire house)	132.00
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(***Substantial Discounts to Dealers and Jobbers***)

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FURNACES AND SHEET METALS AND Warm-Air Heating

Vol. 103, No. 7 July, 1934 Founded 1880

NRA CODE

Published Monthly by
Keeney Publishing Company
6 North Michigan Ave., Chicago
State 6916

Branch Offices
New York
Room 1735
Grand Central Terminal Bldg.
Murray Hill 2-8293

Cleveland
2047 Rossmoor Rd.
Cleveland Hts.
Yellowstone 1540

J. D. WILDER
Editor

Advertising Staff
WALLACE J. OSBORN
R. PAYNE WETTSTEIN
ROBERT A. JACK

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Keeney Publishing Company

F. P. KEENEY
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Treasurer

Member of Audit Bureau of Circulation
Member Associated Business Papers Inc.

Yearly Subscription Price — Anywhere in the world, $2.00; Single Copies, $.25. Back numbers $.50. Entered as second-class matter, July 29, 1932, at the Post Office at Chicago, Illinois under the act of March 3, 1879.

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More than 7,000 copies of this issue are being distributed.

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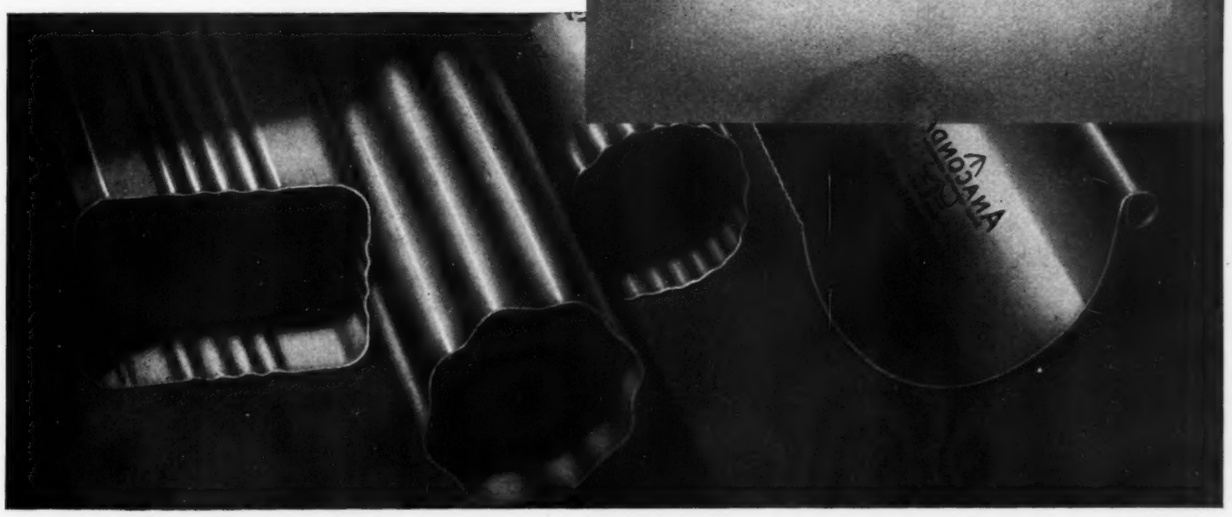

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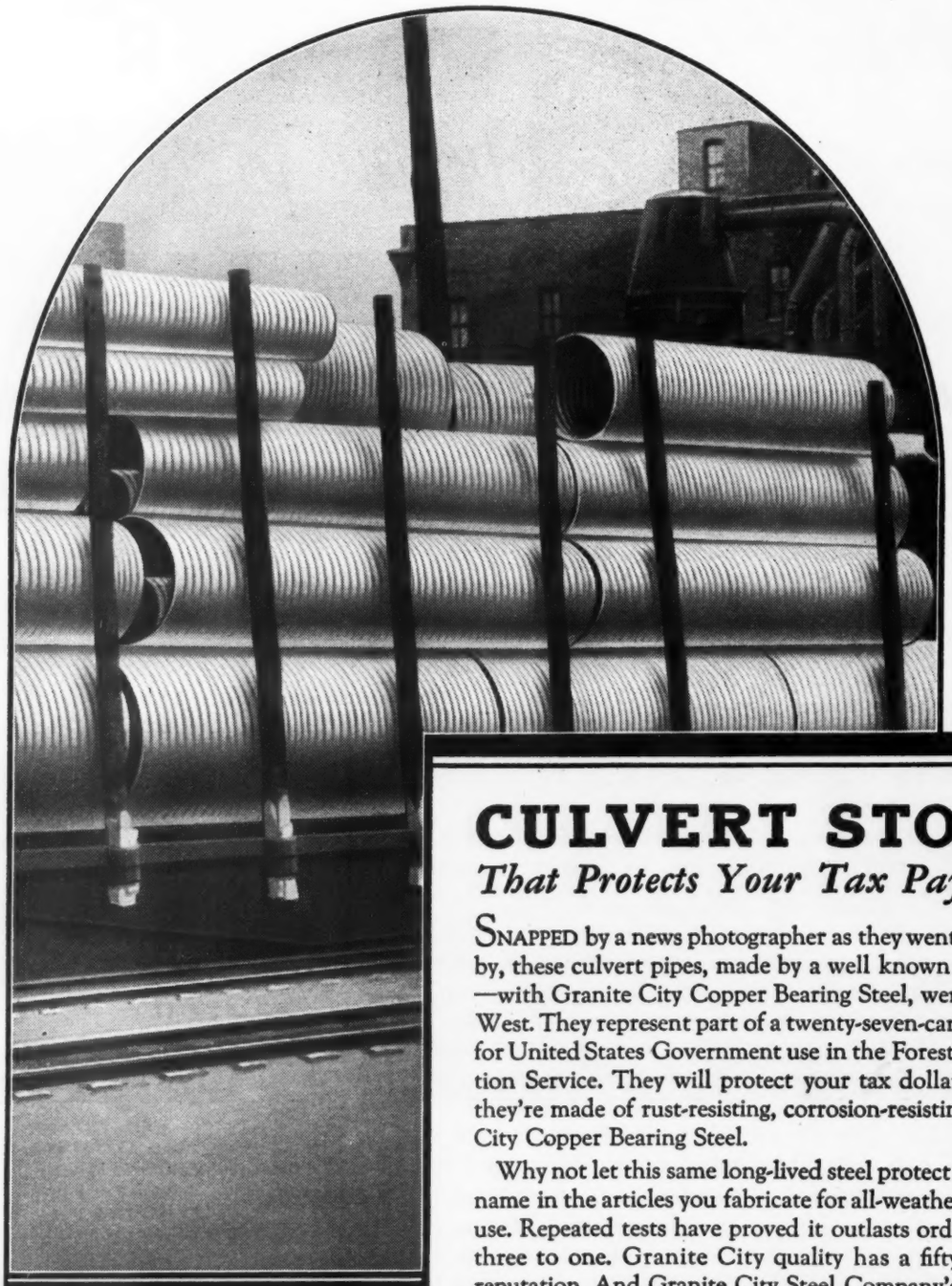

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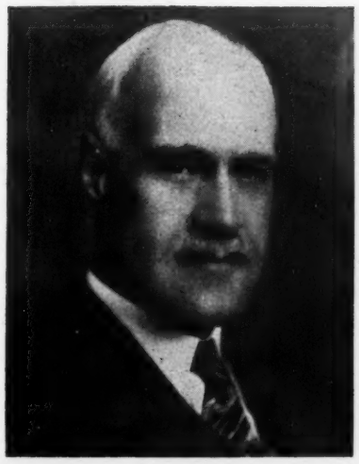

How ERNEST FOX Came to Invent INDEPENDENT "Fabrikated" Register Faces

(REG. U. S. PAT. OFF.)

JAMES WATT, sitting before the fire, saw the power of steam exhibited in lifting the cover of a tea kettle. Isaac Newton was led to the discovery of the law of gravitation by a falling apple. John Gutenberg, toying with a deck of cards as his wife cleared the supper table, got his first hint of printing with movable type.

And Ernest Fox, observing the neat strong construction of the electric toaster on his breakfast table nearly twenty years ago, began to wonder why registers and cold air faces should not be likewise constructed, rather than cast or stamped, as these things had always been.

He took a hack saw and files and for days cut and tried, filed and fitted. So the first "Fabrikated" register face was born.

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INDEPENDENT "Fabrikated" REGISTER FACES

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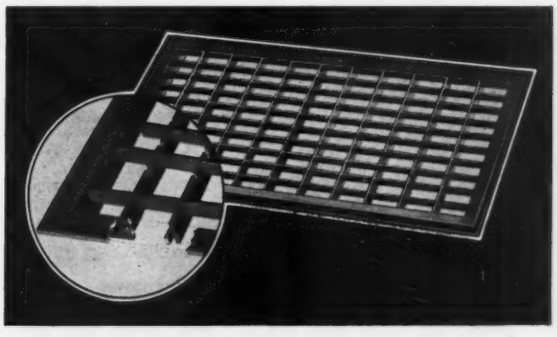
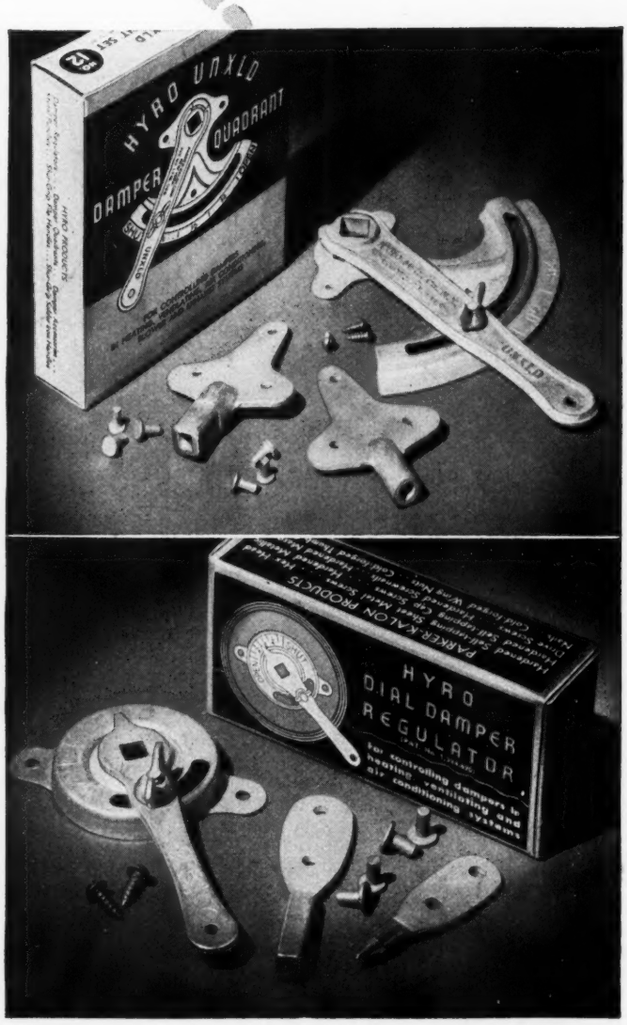


Now! No Need to RUN AROUND IN CIRCLES getting together a lot of parts



One box provides EVERYTHING . . . for a damper control job!

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For round and rectangular dampers to 10"
Set No. 19—3/8" Hyro Dial Damper Regulator
For round and rectangular dampers to 20"

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ABLE SERVANT OF THE CENTRAL WEST

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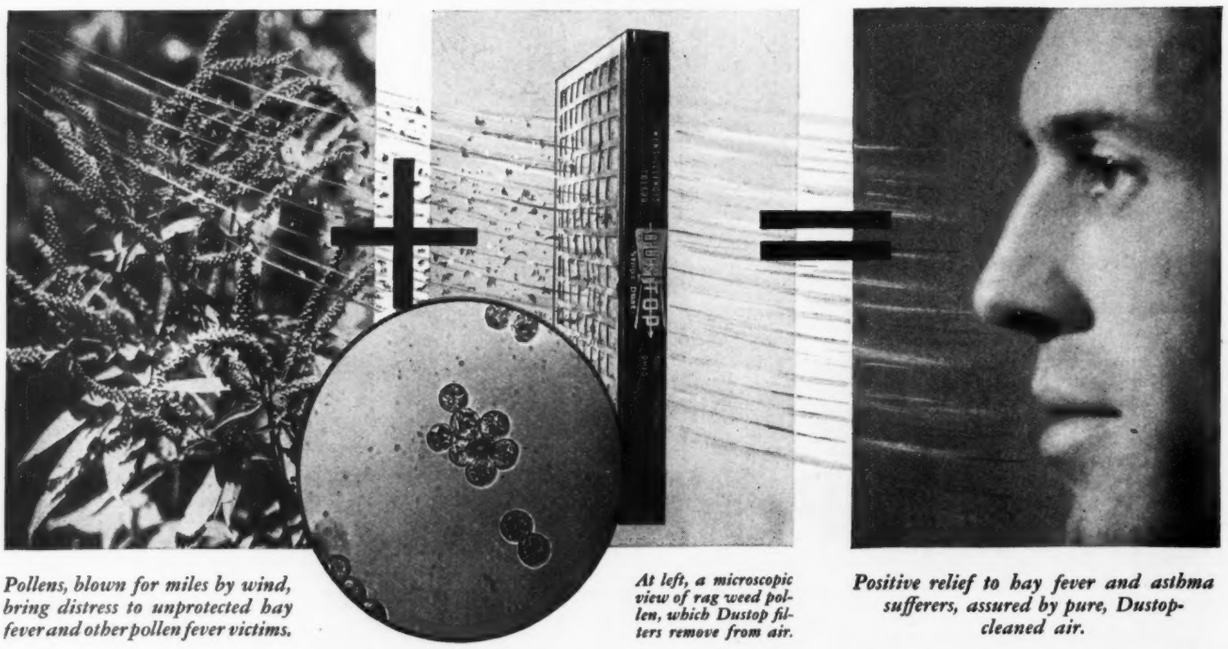

Pollens, blown for miles by wind, bring distress to unprotected hay fever and other pollen fever victims.

At left, a microscopic view of rag weed pollen, which Dustop filters remove from air.

Positive relief to hay fever and asthma sufferers, assured by pure, Dustop-cleaned air.

Hay Fever Relief for Millions —Profit for YOU!

● Medical authorities have proved that hay fever victims can secure practically 24 hour-a-day relief from attack if they pass their normal home hours in a pollen-free house. Independent experiments prove that "Dustop" air filters, installed in connection with a forced air furnace system will remove approximately 99% of pollen from the air circulated in the home. By making these facts known, any furnace dealer can secure *hundreds* of profitable extra jobs installing "Dustop" in connection with fan equipped warm air furnaces. Prospects with gravity warm air furnaces, will in many cases wish to add blower equipment for better ventilation and take advantage of "Dustop" filter protection against pollen.

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OWENS-ILLINOIS DUSTOP AIR FILTERS

VOLUME 103 **AMERICAN ARTISAN** NUMBER 7

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

HOLC and the Federal Housing Act

IN this issue of AMERICAN ARTISAN several pages are devoted to a presentation of pertinent facts relating to the far reaching legislation known as the Home Owners Loan Corporation and the National Housing Act. This legislation should be of vital interest to every contractor because the intent of these laws is to stimulate repair, remodeling, new construction; to loosen credit and generally bring about work for the building industry.

Some uncertainty seems to exist on the interrelationship of the two laws. To clarify we may say that the Home Owners Loan Corporation is intended primarily to help home owners whose property has been foreclosed or is in default by setting up machinery whereby existing indebtedness is refinanced into first mortgages guaranteed by the Federal Government as to interest. The property owner must amortize his indebtedness over a period of years.

The functions of the Federal Housing Act differ radically from those of the Home Owners' Loan Corporation, and the Federal Emergency Administration of Public Works.

The Federal Housing Administration will make no direct loans to home owners or home builders, its function being to provide security and safety for private investors by providing insurance for loans for rebuilding and modernization which will be based on the character of the borrower, and for mortgages on new and existing buildings.

The Administration will assist those owners of property that are not in distress, both as to taking over complete mortgages and assisting in rebuilding and renovation, whereas the Home Owners' Loan Corporation is restricted to assisting those owners of mortgaged homes who are in distress. The H. O. L. C. does not assist in the financing of new homes and advances money for repairs only on homes on which it already has made loans or which are eligible for distress loans.

The Federal Home Loan Bank System, with 12 regional banks, does not lend to individuals, and is essentially a lending institution for mutual savings and building and loan associations. The 2,500 institutions now members of it may borrow from the regional banks on the security of mortgages which they hold.

Under the terms of the National Housing Act, lending institutions, including banks of every type, may insure themselves against losses on loans made to property owners for the purpose of repairing, remodeling or renovating their property. Such insurance will cover losses up to 20 per cent of the total amount advanced by any institution, and should encourage such loans, which will be made primarily on the basis of the character and personal responsibility of men and women whom the lender believes will be able to pay them back in installments. Borrowers who may benefit by availing themselves of this credit include the farmer, as well as the urban dweller, provision being made for the farmer to make his payments at those periods of the year when his crops are sold, while the city dweller will pay his installments monthly.

The process will be simple. Applicants for loans who qualify will make out notes, and obtain their money through their local banks, building and loan associations and other lending institutions, which under the Act may discount such notes at their face value with the Federal Housing Administration.

Loans of like type will also be available on apartment houses, office buildings, factories and other commercial properties, but always within the $2,000 limit.

These character loans will be at low rates of interest, with the principal payable in installments over periods ranging from three to five years depending on the size of the loan.

Because of the necessity of perfecting the organization to administer the Act, it probably will be several weeks before repair and modernization loans will be available.

So far as insurance of mortgages on new construction and on existing buildings is concerned, no definite date can be set owing to the time required to perfect the necessary organization.

The limit on loans for new homes will be 80 per cent of the completed value up to $16,000, with the possibility of the entire sum going into the building. Thus the owner of a lot properly appraised at $600 may erect a $2,400 home with the mortgage money, with the lot as his equity in a property worth $3,000 when completed, escape the burdens and risk of a second mortgage he would need under the existing mortgage system, and within 20 years or less own it free of incumbrance. For insuring this loan, he will pay a small premium. This will provide a pool, not only more than sufficient to take care of all losses, according to the strictest actuarial tests, but actually to serve to retire the loan in less than the stated term.

The provision for existing mortgages is calculated to make liquid the sound loans of lending institutions by making them insurable and available for discount or purchase both by banks now forbidden to discount such paper, and by the national mortgage associations provided under the Act. This should help to free large volumes of money for new construction.

These mortgage associations will be under strict Federal supervision, and will be financed by private capital seeking the safety assured by the mortgage insurance guarantee of the government.

Another effect of the mortgage company provision of the law is expected to be the siphoning of money from the large financial centers where low rates usually prevail to the newer sections of the country where high rates restrict building.

[Cover picture by courtesy of American Builder]

What Is The Home Owners' Loan Corporation—How Does It Operate?

THE Home Owners' Loan Corporation, created under an Act of Congress provides refunding facilities for a substantial proportion of the enormous urban home mortgage debt of America.

During the next three years, HOLC is empowered to issue up to two billions of dollars worth of eighteen-year, 4% bonds to refund mortgages on a possible 400,000 to 500,000 homes.

In the normal refunding operation, bond men deal with a security on which the collateral is known and established. In this operation, due to the great deflation of values which has taken place, every individual parcel of the 400,000 to 500,000 homes affected must be appraised anew, must be studied with reference to legal aspects and implications, must be handled as an entirely new business proposition.

The Organization

To perform this task the Home Owners' Loan Corporation has created an organization consisting of 48 state offices and 208 branch offices in key industrial and agricultural centers of the United States, and personnel of twelve thousand employees, the majority of whom will be only temporarily employed for the initial operation of "manufacturing the bonds."

There are ten million mortgaged homes in America. Possibly one million of them are in default. Officers of the corporation believe that the funds available, reaching 400,000 to 500,000 homes, will tend to stabilize the entire real estate market, resubstantiate values and reinstate equities to a point where this marginal operation will take the strain from even the half million distressed home owners who are not eligible under the act.

With a total urban home mortgage indebtedness of twenty-one billions of dollars in this country, with probably five billions of that sum estimated to be in default, even the two billions provided by the Government can deal with but less than 10% of the total value. The major problem of sorting out the applications is in itself an operation in handling mass correspondence unprecedented in corporate history.

While bonds will be actually used in the operation, these bonds will represent dollars which someone sweated for in the past, saved and invested in a mortgage—and dollars, too, that the home owning debtor must work for, earn, and repay in future years to clear his mortgage indebtedness.

What will actually happen is that home owners will go to their creditors and, with the cooperation of the Home Owners' Loan Corporation agents, work out a refunding operation. The fact that the interest on the bonds is guaranteed by the Government of the United States, and that the principal is to be amortized by the home owner to the corporation over fifteen years, and that the corporation will thus collect a great pool of cash for final repayment of principal, make this a desirable investment from the creditor's point of view.

Who Is Eligible

The corporation is not in the business of taking over mortgages held by going institutions which can afford to carry them. Neither is it designed to take over from such institutions any group of mortgages which is worthless and which the institutions would be glad to get rid of.

It is in one specific division of mortgage indebtedness that the corporation will function; namely, the sound mortgages on which, through loss of employment or other distressed conditions consequent on depression, the debtor is unable to fulfill his obligations.

This group alone is large enough to require the full attention of the corporation. Here are sound mortgages underlaid by valid security. The money which the mortgages represent has been invested either by a private individual or by banks, building and loan associations, insurance companies or other money lending institutions. The individual who borrowed the money for the construction or purchase of a home has used the funds of others and has promised to repay those funds with interest. Under today's conditions he is unable to repay his pledged principal, often even unable to pay his pledged interest or fulfill his social duty of paying taxes. Banks and other money lending institutions can carry a certain percentage of these debtors, provided they can meet their interest payments, particularly where the principal is safe because of the soundness of the initial mortgage.

Bank Relief

It will be appreciated, however, that a point comes in any such situation where the accumulation of even these sound mortgages on which principal installments cannot be repaid—and interest is in default—becomes too grave a strain on the resources of the banking institution. It is in this situation that the Home Owners' Loan Corporation can afford relief to creditor and debtor alike through refinancing the mortgages; replacing a non-income producing investment with one that produces an income of 4% guaranteed by the Government of the United States.

One of the phases of the operation of economic significance is the fact that under the Act creating the Corporation *cash loans* may be made, (First) up to 50% of appraised value on homes unencumbered by

a first mortgage; but in real danger of being lost to their owners by reason of delinquent taxes, assessments or repair liens, and, (Second) up to 40% of appraisal, in cases where the mortgage holder is unable or unwilling to accept bonds.

No private mortgage lending institution, it will be appreciated, will take a property in unsound physical condition. On the contrary, the normal practice is to include sums necessary for such repairs in new mortgages that are written. Properties which their owners have allowed to depreciate during depression years would tend, unless relief measures were offered, increasingly to become a distressed feature of the real estate market, dragging down all values. The availability of money for repair purposes through the Home Owners' Loan Corporation not only permits the reconstitution of values in these properties but contributes visibly, immediately, and directly to employment throughout the essential building trades of America, which account for the pursuits of four million workers in this country.

The monies thus provided go directly into pay rolls for furnace, sheet metal, carpenters, plumbers, masons, electricians, plasterers and other essential groups in the community.

A final factor in the operation is the service rendered wherby the bonds are made available in certain cases to refund the sound mortgage assets of closed banks.

Many debtors, whose basically sound mortgages are held by closed banks, are unable to pay principal or interest at present. This brings up the menace of foreclosure, and its consequent harmful effect on all local realty values, including all other properties on which banks have loaned money, and, in any case, leaves the closed institution without income from these mortgages.

Exchange of these sound mortgages (on eligible homes) for Home Owners' Loan Corporation bonds immediately provides the bank with a new income guaranteed by the Government, frees money for disposal by the receivers and hastens the day when the bank again can be opened.

How Repair and Remodeling Is Handled

The government has published a pamphlet which explains just how to make loans, where to apply, what work is classified as repair, what terms are arranged. Here are the essential parts of that pamphlet.

I. The Law

AN Act of Congress approved April 27, 1934, authorizes the Home Owners Loan Corporation to make loans for repair, remodeling, and modernizing to the following groups of home owners:

1. Those who have already secured loans from the corporation.
2. Those who are eligible to have their mortgages taken over by the corporation.
3. Those who own their homes clear of any mortgages; but *only if they cannot* get reconditioning loans from any private lending agency.

II. Should You Recondition Your Home?

Every home needs some reconditioning every year. But reconditioning is easy to put off. In the past four years of financial strain, home owners generally have postponed repairs. Observers assert that three out of five American homes now need extensive reconditioning. Your home may be one of them. If so, the Corporation will not refinance your mortgage unless the essential repairs are made. This rule is necessary for your own protection. The safety and comfort of your home depend upon it; the protection of the savings you have invested in your home demands it.

III. How Much Should You Recondition?

The amount of reconditioning, beyond essential repairs, which you should seek to have done depends largely upon your ability to repay the loan. If you can afford it, you should do all desirable reconditioning now. You have the opportunity to spread payment for the reconditioning over 15 years at a low rate of interest. Through the Corporation you will have the benefit of disinterested technical advice on what to do and what not to do. You will have assistance in getting reliable builders and workmen. Supervision of the job by the Corporation's inspectors will serve as an additional check against poor workmanship. At the same time, the reconditioning work you provide will promote business in your community. Local merchants will supply the material; local labor will do the work.

Reconditioning includes three distinct operations:

1. *Repair and Maintenance.* Under this heading comes all work designed to restore a house to its condition when new, such as repainting, pointing of masonry, caulking of doors and window frames, reroofing, replacement of gutters, downspouts, floors, screens, plumbing, and other outworn equipment.

2. *Remodeling.* This involves structural changes, such as any enlargement of the dwelling, the addition of a bathroom, a porch, a window, the rearrangement of rooms,

or any other alteration in the design of a house.

3. *Modernizing.* This involves the installation of new equipment, such as insulation, heating plant, electric lights, or running water.

Of these three classes, repair and maintenance are the essentials of upkeep. All homes that are to be kept fit to live in must be put in good repair periodically. Repairs made often need not be expensive. They will generally add enough value to a home to permit a higher appraisal and a larger loan.

Some types of remodeling and modernizing, such as the addition of a bathroom or the installation of running water and an indoor toilet, are likewise essential to the American standard of living. However, they are usually more expensive than basic repairs and may be impossible to borrowers in financial distress. Before a borrower from the Home Owners' Loan Corporation applies for a loan to remodel, enlarge, or modernize his home he should consider the cost very carefully and get advice from the Corporation on the following points:

1. Can he really afford to make the larger monthly repayments on his loan necessitated by an expenditure for remodeling and modernizing? Usually a home owner should not spend more than 25 per cent of his normal income in payments on his home.

2. Does the neighborhood justify the expense of remodeling? A $5,000 house in a $3,000 neighborhood is a poor investment.

3. Will an expenditure for remodeling tend to extend the life of a house which is irredeemably bad because the lot is too narrow, some rooms must be blind, or the like?

4. Is the proposed remodeling sound from architectural and engineering points of view? Remodeling should never be undertaken without competent architectural or other technical advice.

Remodeling and modernizing free from criticism on these grounds must be sound, and, if sound, they will prevent obsolescence and make for a higher standard of living.

IV. Technical Advice and Supervision

Expert advice is essential in remodeling and often desirable in repair. Home owners have frequently suffered from the lack of such advice. The Corporation is providing free to you as borrower the advisory and supervisory services of experienced builders and architects who are employees of the Corporation. They will advise you on the need, desirability, and probable costs of reconditioning your home. Where extensive reconditioning requires the services of an outside architect, the home owner pays the fee.

Bids for the job will be asked from at least three contractors selected by you from a list of approved contractors. The Corporation will investigate the reliability and qualifications of all contractors and mechanics desiring to bid, and only those whose qualifications are approved will be allowed to bid. Approval will be solely on merit. The Corporation will supervise the actual work. In short, it is the purpose of the Home Owners' Loan Corporation to establish a model advisory service on home reconditioning to reduce the danger of ill-advised and irresponsible work of this type.

V. Financing Terms and Costs

Practically all loans for reconditioning made by the Corporation will be in addition to loans for refinancing. Except in very rare instances, all loans will be incorporated in a single first mortgage. The total amount of all loans made by the Corporation to any one home owner cannot be more than 80 per cent of the appraised value of the property nor total more than $14,000.

The mortgage held by the Corporation as security for all advances usually runs 15 years. The borrower pays back the loan, principal and interest, by monthly installments. The rate of interest is 5 per cent. The monthly payment covering both principal and interest is $7.91 for each $1,000 loaned.

The Corporation makes no charge for the services of its employees. The home owner is required to pay fees for all outside services (such as those of appraiser, architect, attorney, and recorder) necessary and incidental to the making of a loan. If advances for reconditioning are made at the time the mortgage is refinanced and are added to the amount of the loan, there will be little or no extra cost. If the owner already has a loan from the Corporation and now applies for a reconditioning loan, he will have to pay a new appraisal fee and the costs of making and recording a new first mortgage. These costs will be kept to a minimum.

When made at the time of refinancing, loans for reconditioning may amount to any sum authorized by law and approved by the Corporation. When made after refinancing has been completed and the mortgage recorded, loans for reconditioning should not be less than $200.

VI. How to Obtain a Reconditioning Loan

The only place to apply for a reconditioning loan is the local office of the Home Owers' Loan Corporation within the District in which your home is located.

If you are applying to the Corporation to refinance your mortgage, the Corporation will advise you when to apply for a loan to recondition your home. A special form for this purpose will be provided. If you already have a refinancing loan from the Corporation, make separate application for a reconditioning loan.

Applicants will be notified as soon as possible concerning their reconditioning as well as their refinancing loans.

VII. Home Inspection List

Check your home against the following list periodically. It will insure you against overlooking some essential reconditioning.

[Editor's Note—The government furnishes a list of several hundred repair needs. We can print only those applying to our field.]

Roof, Flashing, Gutters, and Downspouts:

1. Broken, loose or missing shingles, slate, tile, or other material requiring replacement or repairs.
2. Metal or roll roofing with cracks, open joints, or worn-off coatings, requiring application or water-proofing materials, painting, or repairing.
3. Rusted or defective flashing requiring painting, repairs or replacement.
4. Leaky gutters or conductor pipes requiring repainting or replacing.
5. Leakage around skylights requiring repainting of the frames, glazing, flashing, or repairing.
6. Leakage around scuttles, trapdoors, or other roof openings requiring flashing, painting, or repairing.
7. Defects in chimney requiring pointing or replacement of brick.

Heating and Ventilation:

1. Clogged smoke pipes or flues requiring cleaning.
2. Boiler coils or baffles requiring cleaning.
3. Grates warped and broken requiring replacement.
4. Cracked fire box requiring repairs.
5. Boilers with cracks or leakages requiring repairs or new parts.
6. Cracks in chimney masonry requiring pointing.
7. Woodwork adjoining pipes and heating system requiring fire protection.
8. Coating on boilers requiring patching or recovering.
9. Heating pipes requiring covering or repairs to existing covering.
10. Leaky radiator valves requiring repacking.
11. Installation of additional radiators if needed.
12. Proper painting of radiators to increase efficiency.

Does the Home Owner Think of Heating When Planning Repair and Remodeling?

You may ask this question. An excellent sidelight is given in this report covering a repair contest. We should be encouraged to find how many home owners think "better heating" when planning repair work.

WITH the interest now evident in the general uplift of the home building and repair field due to the impetus of HOLC and the new legislation covering refinancing, repair, remodeling and renovizing contractors may be interested in knowing just how much attention is paid by the owner with money to spend on repair or remodeling to the benefits and advantages of new heating and air conditioning equipment.

A cross section of public thought and interest is given by a review of the 1933 Better Homes and Gardens (a popular magazine) contest offering $3,000 in prizes to the family or individual who by remodeling or by the installation of home equipment or home furnishings most increased the comfort, convenience, utility or beauty of that home. More than 18,000 entries were received.

An analysis of the completed entries received reveal many interesting facts to those interested in the promotion and sale of heating equipment.

Entrants spent all the way from a few dollars up to $17,000—with the average amounting to something more than $1,400. Of this amount the average remodeling family spent an average of $87 for heating equipment and supplies.

The importance of remodeling activity in creating a market for the heating industries is indicated not only by the high percentage that remodeled their heating systems, but also by the high percentage who bought new equipment.

Nearly one-third of the entrants installed new heating equipment in their remodeled home—and the type installed covered very nearly the entire field. Warm air, oil warm air, gas warm air, hot water, gas hot water, steam, oil, and coal stoker systems were frequently mentioned.

The frequency in which new rooms were added to the remodeled home stimulated this demand for new equipment. When a new dining room, or living room, or bedroom, or bathroom or kitchen was added the heating problem became one of great importance. Many times entrants mentioned the fact that old furnaces installed years before would not carry the additional load or that connection with the new additions could not be conveniently made. Problems such as these and the ability of entrants to realize the savings to be made in lower fuel bills inevitably resulted in the purchase of new equipment.

As one contestant wrote, "remodeling is like the path of sin—it's so easy to get in deeper and deeper." Entrant after entrant wrote of plans that originally called for the expenditure of less than $100, only to grow and grow until they called for the expenditure of hundreds or thousands of dollars.

Better Homes and Gardens announced four months ago another Better Homes Contest. It offers another $3,000 in cash prizes for remodeling activities. Already more than 23,000 entries have been received.

A method whereby the retailer and the newspaper can co-operate with the National Better Homes Contest has been developed. The Better Homes Contest Editor, Better Homes & Gardens, Des Moines, Iowa, will send, on request, the details of the merchandising plan.

The Real Property Inventory

You may have heard that the government has been making a house-to-house survey of residential structures. Investigators tabulated age and condition of the building; materials of construction; occupancy and vacancy, their duration; rentals; charted values, number of rooms, type of heating, plumbing, lighting, cooking, bathing facilities, etc. Here are the figures on the heating facts.

State and City	No. of 1, 2, 3, 4 Family Dwelling Units	No. of Dwellings Needing Repair (Minor and Major)	Type of Heating Plant: Warm Air	% of Total	Steam or Vapor	% of Total	Hot Water	% of Total	Stoves or Other	% of Total	Type of Fuel Used*: % Using Coal	% Using Wood	% Using Gas	% Using Oil	% Other Fuels
ARIZONA															
Phoenix	11508	7016	823	5.7	636	4.4	176	1.2	11617	87.7	34.9	47.2	3.1	6.9	5.9
ARKANSAS															
Little Rock	26041	15534	72	0.3	276	1.0	86	0.3	27288	98.1	1.9	35.7	61.7	0.0	0.1
CALIFORNIA															
Sacramento	30884	16853	5755	16.0	2070	5.6	232	0.6	25841	70.8	7.0	53.0	34.0	3.0	1.0
San Diego	54140	26665	1993	3.1	2218	3.4	167	.2	48742	76.5	0.9	35.2	45.6	3.3	12.1
COLORADO															
Pueblo	11301	6486	4115	32.3	821	6.1	333	2.6	7230	57.6	93.6	0.6	4.1	0.3	0.2
CONNECTICUT															
Waterbury	14634	7866	4463	14.7	2343	7.7	6036	20.0	17347	57.2	63.3	3.1	0.1	6.6	26.4
FLORIDA															
Jacksonville	34479	13049	608	1.1	1405	3.3	469	1.0	39703	93.4	20.4	66.1	1.1	1.0	7.3
IDAHO															
Boise	5345	2993	1659	25.6	236	3.6	786	12.1	3891	58.4	89.2	5.6	0.0	0.8	4.0
ILLINOIS															
Decatur	14952	10022	10597	64.6	983	6.0	872	5.3	3902	23.8	96.8	0.2	1.4	0.9	0.2
IOWA															
Des Moines	37489	23526	27404	61.1	4341	9.6	2116	4.7	10854	24.2	93.0	0.31	1.8	4.8	0.2
KANSAS															
Topeka	16874	10296	8690	45.4	957	5.0	512	2.6	8835	46.2	62.0	5.0	26.7	1.2	0.5
Wichita	28970	18116	11314	33.2	2298	6.7	704	3.4	19618	57.9	43.1	7.7	46.5	1.9	0.6
KENTUCKY															
Paducah	7278	5529	789	9.7	473	5.2	216	2.4	7452	82.5	97.8	0.6	0.0	0.1	0.1
LOUISIANA															
Baton Rouge	7273	4649	19	0.2	60	0.8	338	4.4	6659	86.6	22.6	21.7	46.8	0.8	0.7
Shreveport	21077	12155	3	0.0	44	0.2	14	0.1	21552	98.5	0.2	6.3	92.6	0.0	0.0
MAINE															
Portland	13791	5455	1888	9.6	10070	51.1	2063	10.4	5451	28.3	80.7	1.81	0.31	10.7	5.4
MARYLAND															
Frederick	3222	1439	460	12.2	1534	40.5	320	8.5	1464	38.6	96.3	2.4	0.0	1.0	0.1
Hagerstown	6640	2465	2595	31.8	1957	24.0	825	10.1	2765	34.0	97.0	0.2	0.1	2.5	0.1
MICHIGAN															
Lansing	20025	12344	15001	72.1	2663	12.8	406	1.9	2699	13.0	97.4	0.0	0.2	1.7	0.5
MISSISSIPPI															
Jackson	10843	7281	148	1.3	103	0.9	87	0.7	6466	56.7	21.5	24.9	53.5	0.0	0.0
MISSOURI															
Springfield	15100	10140	4162	25.7	487	2.9	802	4.9	10594	65.4	59.8	30.5	4.5	3.5	0.4
St. Joseph	18157	11256	8315	41.7	990	4.9	460	2.3	9525	47.8	83.7	1.0	7.9	5.5	0.6
MONTANA															
Butte	8350	4768	1242	11.6	822	7.7	834	7.8	7795	72.7	68.0	1.7	27.7	0.2	2.1
NEBRASKA															
Lincoln	19155	9830	14660	63.1	1907	8.2	2107	9.1	4452	19.2	72.9	3.1	12.4	10.2	6.0
NEVADA															
Reno	4901	2246	1646	26.6	965	15.6	244	4.0	3299	15.3	62.2	17.1	0.0	18.9	0.7
NEW HAMPSHIRE															
Nashua	6012	2529	1433	17.9	1976	24.8	201	2.5	4286	53.8	48.5	14.8	0.5	20.8	13.9
NEW JERSEY															
Trenton	30895	15923	15886	37.1	6982	16.3	9670	22.6	9993	23.3	94.1	1.2	0.1	3.7	0.3
NEW MEXICO															
Albuquerque	6653	3384	2010	25.7	740	9.5	347	4.0	4704	60.2	72.0	6.1	20.3	1.2	0.1
Santa Fe	2142	1064	132	4.9	236	8.7	44	1.6	2302	84.6	34.6	34.7	30.1	0.4	0.0
NEW YORK															
Binghamton	20218	9566	19046	58.7	5192	16.0	887	2.4	7196	22.4	96.0	1.2	0.6	1.9	2.0
NORTH CAROLINA															
Asheville	11273	7401	2273	18.1	1782	14.2	1093	8.7	7410	58.9	97.8	1.4	0.0	0.3	0.2
Greensboro	11561	7660	871	7.2	2252	18.7	182	1.5	8728	72.3	95.6	3.1	0.0	0.5	0.5
NORTH DAKOTA															
Fargo	5484	2798	3491	46.7	1005	13.4	1994	26.7	958	1.6	86.3	0.5	0.0	12.6	0.2
OHIO															
Zanesville	9624	6122	4402	44.1	261	2.4	385	3.6	4021	52.6	91.6	0.0	7.5	0.0	0.6
OKLAHOMA															
Oklahoma City	44065	22001	2471	5.0	1264	2.5	80	0.1	44434	89.4	6.1	8.0	84.4	0.2	0.4
PENNSYLVANIA															
Erie	29529	13401	19028	57.5	1416	4.2	1272	3.8	11090	33.4	83.2	1.2	3.8	0.7	10.5
Williamsport	7799	5142	5495	45.4	1489	12.3	1694	14.0	3402	28.3	97.0	0.3	0.6	1.8	0.1
SOUTH CAROLINA															
Charleston	9022	6008	270	1.5	136	0.8	69	0.3	13516	94.0	26.6	58.7	1.5	3.2	7.1
Columbia	9590	6490	1130	9.3	369	3.0	610	5.0	9960	82.1	66.3	31.3	0.0	0.6	0.5
SOUTH DAKOTA															
Sioux Falls	7261	4370	6208	67.2	668	7.2	494	5.3	1859	20.1	85.3	1.1	7.9	5.1	0.5
TENNESSEE															
Knoxville	28588	20018	4687	14.5	2524	8.0	309	0.9	24691	76.5	93.2	5.9	0.0	0.0	0.5
TEXAS															
Austin	12595	7403	358	2.4	57	0.3	8	0.0	13953	96.8	1.6	38.2	58.5	0.4	0.8
Dallas	64066	40074	692	0.8	1607	1.9	397	0.4	80608	96.4	1.1	21.2	77.0	0.0	0.3
Wichita Falls	9407	6261	69	0.7	225	2.1	12	0.1	10351	96.5	0.2	13.1	84.4	0.3	1.3
VERMONT															
Burlington	3715	2364	2029	30.2	703	10.5	960	14.3	2855	42.6	68.6	5.8	0.0	17.3	5.8
VIRGINIA															
Richmond	49075	24493	1910	3.4	3567	6.5	14228	25.9	34703	63.7	85.0	8.4	0.0	2.2	0.1
WEST VIRGINIA															
Wheeling	34109	25703	14307	32.0	780	1.8	377	0.9	28838	64.6	82.0	0.0	16.1	0.0	0.8
WISCONSIN															
Kenosha	10541	6873	8787	63.6	444	3.2	1874	13.5	2690	19.7	97.0	0.1	0.1	2.6	0.2
Racine	14014	9626	12403	61.1	1066	5.2	2374	11.7	4276	21.5	94.8	0.5	0.1	3.7	0.1
WYOMING															
Casper	4073	2783	1110	19.8	525	9.3	362	6.4	3584	63.8	44.0	0.6	52.6	0.2	1.8

*These figures show the number of owners in per cent of all homes in community burning each type of fuel.

Ventilation For A Doctors Office

By

Paul R. Jordan

THIS installation entails a recent ventilation layout for a waiting room and wash room in a doctor's suite of offices. The entrance to the suite is a reception room, and this reception room and the doctor's office are located along the outside wall. They are ventilated by means of the outside windows.

The waiting room and wash room are entirely inside, being approximately 10 feet away from the nearest outside wall, with partitions between. The waiting room is 7 feet wide by 10 feet 6 inches long with a ceiling 10 feet 4 inches high. The wash room is 3 feet by 7 feet with the same ceiling height, namely 10 feet 4 inches.

One of the first things to be done is to make a survey of the heating facilities. In this particular case, the heating is by direct steam radiation and all of the radiators are along the outside wall of the building, therefore the rooms to be ventilated are entirely unheated, although they are surrounded by heated rooms and corridors. Inquiry into the matter of heating reveals that on cold wintry days, the heating is inadequate. Consequently, ventilation must be accomplished in such a way as to conserve heat, and if it is possible to help the heating through increased circulation, that will be desirable.

The chief complaint in summer is that the rooms get stuffy for want of proper ventilation. Heat removal to give a satisfactory summer condition can be included in the installation at a small additional outlay.

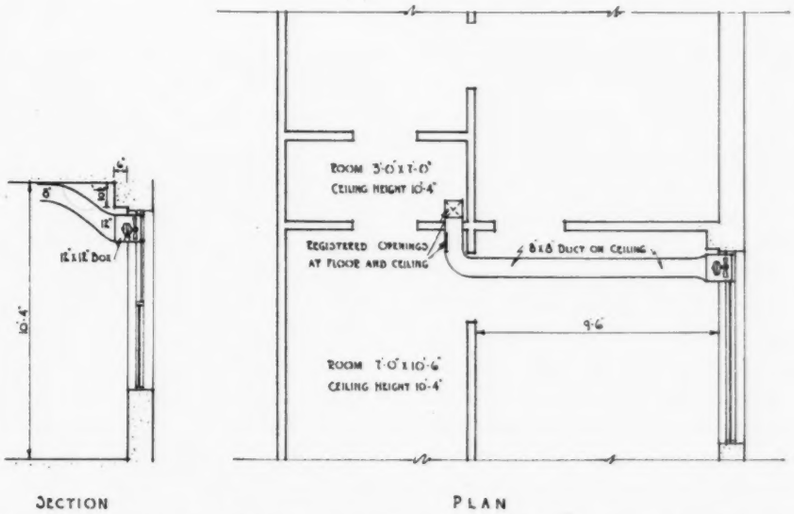
This suite is on the fifth floor of an eleven-story building. The number of stories above the rooms to be ventilated always has a bearing on the ventilation because of the flue action created by the building. A building 100 feet high has the same potential flue action as a flue 100 feet high at the same outside-inside temperature difference. Of course, window leakage cuts down the "pull" but nevertheless, flue action in the building is very positive and must be taken into consideration.

In the building in question, there is no way to get to the outside excepting by ducting to the outside wall 10 feet away. There are no ducts available running to the roof, therefore it will be necessary to ventilate by means of ducts run *to* and *through* the outside walls.

A test for flue action can easily be made by opening the windows or doors and noting the results. Opening windows at various points in this outside wall gives us a strong inflow of air at every point. These windows open on to a court so that wind direction is not responsible for this condition. It is evident then that an area of low pressure is being created throughout the entire suite by the flue action of the elevator shaft and the stairways.

It would be possible to ventilate these two inside rooms by running a duct from the outside wall to them and equipping the duct with diffusers and dampers. Such a duct would become a positive intake because of the low pressure maintained within the rooms. The objection to this arrangement be on the basis of heating and not of ventilation. Such a plan would ventilate by introducing fresh air into the rooms, but the fresh air would be cold and the rooms would be chilled.

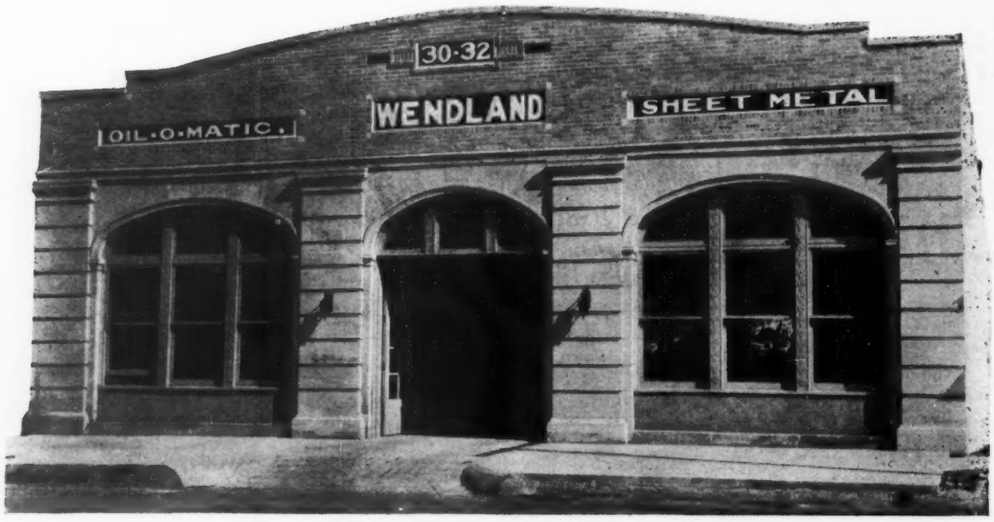
The heating problem makes it necessary to use an exhaust system. Such an exhaust system will have three advantages; first, it will draw heat to the rooms instead of chilling them; second, it will induce circulation which will tend to help heating. (These two apply to winter problems.) And third, it will be possible to exhaust the hot air from the ceiling in summer, which will make for summer cooling as well as ventilation.



Sectional elevation and plan of the suggested layout for the ventilating system recommended for the particular heat removal problems of this article.

The positive inflow of air through any opening, indicating the area of low pressure spoken of before, shows the necessity of using a fan which will operate against a certain amount of pressure. For this job a 9-inch, 8-blade propeller type fan with a synchronous speed of 1725 R. P. M. may be used. This cannot be classified as a high pressure fan, but it will deliver against the nominal pressure indicated. A blower type of fan might be some-

(*Continued on page* 58)



Keep Customers Satisfied—

and you'll get business, says H. G. Wendland, Past President, Texas Sheet Metal Contractor's Ass'n

THERE are many things that enter into the business of sheet metal contracting and its allied lines which count for just as much as the mechanics of the working of metal.

One man who has realized this since 1921, when he began business under his own name in San Angelo, Texas, is H. G. Wendland, who has a very successful record as a sheet metal contractor.

"Securing business is something I have often thought plenty about," he states. "In my first years of 1909 to 1921, when I was foreman of the present business—then owned by the Findlater Hardware Company—my whole attention was directed to the mechanical end, as I believe it should have been.

"A sheet metal contractor should by all means be thoroughly versed in this part of his business first—then he should worry plenty about business methods. Of course, 'worry' isn't just the right system, but it expresses a little thinking and sound thought to running a business.

"In my 29 years of business I've found one axiom that holds true, and that is that the best way to get business is to keep satisfied customers. That's the finest way we have of getting business—new or old.

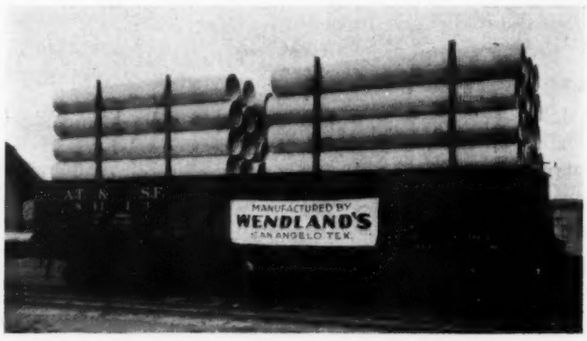
"Personal contact is the most direct method of all—direct mail or newspaper advertising can help, but can't sell sheet metal work by itself. It might pave the way, but it can't complete the selling job. You have to do that personally.

"And the best way to do just this is to make your word your bond and never make a contract that you cannot fulfill. We've set that up as one of the foremost rules of our business, and I lay a goodly share of our success to the fact that we've stuck to it—even though it did mean turning down some juicy plums.

"There's another little secret, and that's discounting all bills and carrying all accounts and notes. It takes a little sound figuring, but any sheet metal contractor who sticks to what I've just said won't have to worry about the simple matter of financing his contracts and notes and is much better off if he carries them himself.

"Newspaper advertising does one thing for us—it helps to keep our name before the public and build confidence in the name 'Wendland.'

"A sheet metal contractor doesn't offer specials like a dry goods or grocery store, so why should he expect newspaper or other advertising to bring him direct business? If he'll use those advertising mediums to build his business, as a whole, they will perform their best purposes.



Corrugated culvert pipe manufactured in the Wendland plant is shipped all over west Texas. This carload is going to a road construction project

"We believe in being a part of Board of City Development activities and take an active interest in this work, as well as civic affairs and church work; in fact, we're in everything our city does except one thing and that is politics—business will not work with politics."

Wendland was president of the Texas Sheet Metal Contractors' Association for three years, which speaks for the esteem his fellow contractors hold for him.

"What do we consider important in our selling program? Two things —first, quality merchandise and, second, price and service. The best way to get new business is through satisfied customers.

"More than once we've been told that the entire topic of conversation upon our completion of some job has been Wendland—if that isn't an end, what is? And it's good business!

Good roads have made it possible for fabricated material to be hauled by truck at some saving. Sound thinking developed this market

which they use in their tank department. Wendlands make Underwriter storage tanks for the major oil companies, either electric or acetylene welded. Being 300 miles west of Dallas, they have freight rates to their advantage on made up stock. All their sheets are purchased in carlots.

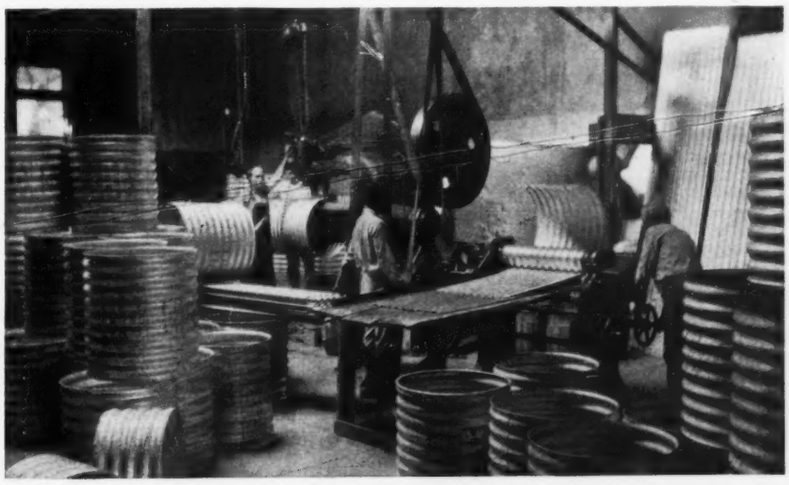
Wendland's wholesale corrugated steel storage tanks, wagon tanks and stock tanks to two of the largest mail order houses for that part of the State and supply nearby lumber yards with their flues, valleys and general requirements in sheet metal products.

In the culvert line they sell chiefly the state of Texas and to counties, ranging from 16 ga. to 10 ga. in weight.

"We seldom ever fire a good man," Wendland says; "some of our men have been with us since we started, and when we do have to let a man off, they can never say truthfully that we had them slight a job, but we have fired men for slighting their work.

"One other thing we all firmly believe in is—confidence. We all know that there are times when this same confidence is sorely needed and present conditions are not the first time this need has arisen.

"We have gone ahead selling our service twenty-four hours a day, being on the job all the time building confidence in our firm and in our work. Much of the advertising we have run has had this confidence motif.



One part of the Wendland shop is devoted to the fabrication of culvert pipe. Power equipment is used with a machine for each operation. Drums for oil storage are also made here. The equipment can handle metal from light sheet to ¼-inch steel

"We often use the slogan, 'We make it hot for our customers' or 'we work iron and steel for a living,' both old slogans, but they deliver a kick every time."

When Wendland first purchased the business it employed an average of from 4 to 5 men in his shop—now his regular force consists of 10 men, outside of his bookkeeper and salesman.

He does all classes of sheet metal work, from the lighter gauges with contract work, up to ¼-inch steel,

Satisfactory Work

"We have had hundreds of people remark on the confident attitude of our workmen. These people do not mean that our workmen are cocky or self satisfied, but that the impression they convey indicates that they feel sure the work they, as representatives of our firm, do will satisfy. We have tried to instill this attitude by giving the men some recognition of good service which will make them reasonably sure of their jobs and of our firm's continued growth. That we have succeeded is indicated by these remarks from the public we are serving.

"There is nothing sensational in the things we do or in the business we have established. It is the result of hard work, of sensible thinking rightly applied, and confidence in our ability to do exactly what we contract.

"A goodly part of the manufacturing business we have established has, we feel sure, been due to our confidence in our ability to make a good product at a fair price. These specialties have paid us good profits and ironed out many of the ups and downs of the construction season."

The National Warm Air Heating Convention

THE mid-year meeting of the National Warm Air Heating and Air Conditioning Association, held in Chicago June 12, 13 and 14, was marked by good attendance and a smooth moving program covering more ground than usual.

In opening the meeting proper on the second day, President H. T. Richardson discussed briefly the progress made in setting up the necessary organizations and means of compliance under the manufacturers' code. An increase in membership was indicated in the president's report while an interesting sidelight explained the elimination of some of the "rackets" which had been faced up until last December.

I. W. Rowell

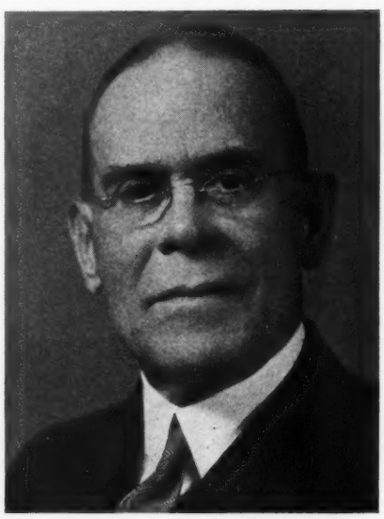
Following President Richardson, I. W. Rowell, General Manager of Lakeside Company, Hermansville, Michigan, delivered an address on the subject "Cooperation with Heating Contractors Essentials." Two sides to the question of how best to extend co-operation were presented; one by Mr. Rowell and the other by J. F. Firestone. Mr. Rowell pointed out that there are something like 26,000,000 families in the United States living in 24,000,000 one and two-family dwellings and stressed the fact that all of these dwellings are perfect set-ups for warm air furnace and air conditioning equipment sales.

The speaker stated that the industry can assume an average cost of $500 for an air conditioning installation in each of these dwellings indicating a total possible business of more than $12,000,000,000. This excludes the millions of small stores, schools, churches, taverns, etc., which complete our field.

Figures were cited indicating that at least 26 per cent of all homes are heated with warm air, steam or hot water and that about 400,000 new small structures are built in an average year. Mr. Rowell made an appeal to dealers to get behind one line of equipment and push that line as strenuously as possible. Such a line should be selected with the view of having confidence in the manufacturer and a belief in the equipment handled. Such an arrangement insures the fullest co-operation from the manufacturer; the sales and engineering departments become acquainted with the dealer's particular problems; the result is elimination of much waste motion.

H. T. Richardson, President

J. F. Firestone appealed to dealers to make more intelligent use of data developed by the National Warm Air Heating and Air Conditioning Association research staff and by manufacturers' engineering and research departments. Mr. Firestone declared that most of the basic engineering problems have been worked out so such problems need no longer be a source of worry and declared that from now on the big thing was intelligent merchandising of the equipment and information available.



Allen W. Williams, Managing Director

B. L. Johnson

"What's Ahead in Residential Building," was the subject of an address by Bernard L. Johnson, American Builder magazine. Mr. Johnson emphasized that much progress is to be anticipated from the rural field where only a small percentage of buildings are equipped with central heating. He also pointed out that building surveys indicate a growing shortage of small dwellings and that during the last two years more houses have burned down than have been built. Mr. Johnson stated that surveys indicate a considerable boom in small building construction just as quickly as financial problems are all ironed out.

H. W. Thorne

H. W. Thorne, President of the Holland Furnace Company, spoke on the subject "Is Our Business Different?" Mr. Thorne made the point that most lines of business are divided into three divisions—research, production and distribution. "Our business is no different from that of dozens of other industries in the general construction field," declared the speaker. "All industries catering to the construction field need to adopt more advanced methods of sale and it seems likely that this general subject of better selling will become the outstanding problem of the next few years."

Professor J. D. Hoffman, Purdue University, chairman of the code committee, reported that some changes have been made in the Standard Code. The changes are as follows:

1. Add to the bottom of note 5,

page 9, the following: "When such increases are made, corresponding increases in sizes should be made in stacks, fittings and registers, as per sections 4 to 8."

2. Under Limitations of the Code, Section 9, (e) twelfth line delete the words "round fire-pots and" . . . so as to read—"The rating formula is applicable to furnaces of the common type of construction having ratios of heating surfaces to grate area between 15 and 30."

Professor Hoffman stated that letters had been received by the code committee asking if changes had been made in Table A to agree with the 1934 Edition of the A. S. H. & V. E. Guide. Professor Hoffman said that the opinion of the code committee is that these changes should not be made as yet because the values given in Table A are extra safe and serve as an additional factor on the safe side in calculations.

F. E. Mehrings

Trade Relations was the subject of an address by F. E. Mehrings, Meyer Furnace Company, Peoria, Illinois. Mr. Mehrings stressed the advantages which have accrued since the signing of the manufacturers' code and pointed out that both dealers and manufacturers can benefit by the provisions of the code because the regulations have removed many of the points of argument which existed for the last ten years or more. Mr. Mehrings reported that questionnaires mailed to manufacturers indicate that 68 firms are well satisfied with the code, 12 have found no particular advantage and only 5 report the code detrimental to their business. The speaker made a plea for better relationships between dealer and manufacturer to the end that air conditioning shall remain one of the major fields of activity for the furnace industry.

Beverly S. King

Beverly S. King, Deputy Administrator who handled the code of the manufacturers in Washington, delivered a paper covering the general advantages found to date by industry operating under signed codes. Mr. King pointed out that the entire idea of codes is something new to American business and that it should be expected that changes will have to be made in our ways of thinking. He declared that the ultimate aim is to make industry self-governing. The speaker stated that much unwarranted criticism has been leveled at codes and their application but that inasmuch as industry seemingly has been unable to govern itself and remove points of controversy some new basis of operation had to be worked out.

W. C. Markle

W. C. Markle, Secretary of the National Sheet Metal Contractors' Association discussed briefly the work to date of the contractor's code. Mr. Markle emphasized the wide variety of work handled under this one code and pointed out how really difficult it has been to form one code satisfactory to all the varied industries under it. He gave some very interesting facts pertaining to the progress of code development to date.

Code Reports

A. W. Wrieden, Managing Director of the code for the furnace manufacturing industry explained the work accomplished to date and declared that all the problems pertaining to the manufacturing interrelationship, labor and sales ethics have been worked out and that the committee is now prepared to embark on a program of legal enforcement.

R. W. Blanchard reported that the code for the register manufacturing industry has been re-written many times and is now in Washington but has not been signed. George Harms, reporting for the furnace pipe and fitting industry, stated that their code has been put in final form but is not yet signed. Mr. Harms declared that if the code accomplishes only one thing—the sale of pipe and fittings above cost, including a reasonable margin of profit—the industry will consider the code highly successful.

According to the custom, the morning session on the last day of the meeting was devoted to reports from the research staff and the research committee.

F. G. Sedgwick, chairman of the Research Advisory Committee, summarized the work accomplished to date covering gravity and mechanical heating systems and many of the interrelated problems of cleaning, humidifying, controlling and designing adequate gravity and mechanical systems.

A. C. Willard

Mr. Sedgwick introduced Professor A. C. Willard, President-elect of the University of Illinois, who discussed the research program as carried on during the last fifteen years. Professor Willard raised several points of deepest importance to the industry—points which he declared we have not taken cognizance of and which he declared must be worked out before truly satisfactory comfort conditions can be provided the American home owner.

These points are as follows: Our industry cannot get away from the fact that no one piece of data developed can stand by itself and that all facts are definitely related to other facts which have been investigated, are in the process of investigation or which must be investigated in the future.

"In other words," said Professor Willard, "we cannot separate register air temperature, combustion rate, bonnet air temperature and such facts from the house in which the system is placed. Also, the efficiency of the furnace is only important in relationship with the efficiency of the distributing system and the house as a unit. This can be illustrated by pointing out how, in the early days furnace efficiency was based upon the bonnet Btu delivered, but fifteen years of research have indicated that such a loss as indicated by the drop in bonnet effi-

(*Continued on page* 55)

The Missouri State Convention

THE fourteenth annual convention of the Missouri Sheet Metal Contractors Association was held on June 7 and 8 in St. Louis with a better than usual attendance.

In opening the convention Secretary Steinmetz said:

"General business conditions which have hampered the growth of industry and establishment of sound organization have now reached their pinnacle, and are beginning to topple; the path is now open, with every advantage, to unite and create an organization that has never been equalled in the history of the Missouri Sheet Metal Contractors.

"For fourteen years our association, although not having prospered to any great extent, has survived, which points to the ultimate fact that it has accomplished some good. According to the National Recovery Act, and the desires of President Roosevelt, through the code, it is necessary that we continue this organization with each and every one of us helping to build it up to the pinnacle of success and prosperity."

Cost Accounting

An address, "Cost Accounting to Conform to Sheet Metal Code," was given by Norman E. Duehring. The speaker said:

"The NRA has gone through many stages. First, that of the Blue Eagle Drive of last summer, when employers were asked to take charge of changing their wages and hours of work. Second, the work of writing the codes. This was a tough job, as you all know. The idea of writing rules of the game is a new game for this country as well as others.

"At the present time we are in an enforcement stage of the codes, now that the codes are prepared and we can understand what codes are about.

"The next stage which lies ahead is studying the effect of the codes and changing them according to experience. We are continually mending and changing this code, as experience shows us various things.

"Codes are not designed to eliminate competition, but to make that competition fair, open, and "above board." Then came the difficulty of "What is cost?" There are a great many things that go to make up cost.

"Shall the expenses of maintaining a large plant when you are only using part of it be included in the cost? Your code, or the supplementary code for your particular industry, places a responsibility upon your code authority of designing a cost accounting system. Formulate an accounting system with methods of estimating. It will probably take four or five months to make up a new accounting system. I presume that when it is finally set up, it will consist of a book or estimating form specifying how the cost shall be estimated. Then it must be taken to NRA and approved, which may take another two months. So, in the meantime, what are you going to do? Provision is made in the code for that. One of the very important provisions is that no member shall sell or offer to sell material below regular cost.

"The code says that overhead expense shall not include depreciation on unused facilities, interest on investment, interest on indebtedness, or selling expense. Why excluded? The intent of this section of the code is to set a floor level of cost under which no one shall sell. The intent of this section to establish a more level cost is not making any progress.

"But there are also responsibilities. These codes will never be successful unless you accept these responsibilities. When industry takes hold, when industry co-operates, these codes are effective and very valuable to the trade. On the other hand, where members won't co-operate, those codes die away and cannot be enforced.

"This is a job for industry to do with the backing of the government."

OFFICERS, 1934

President—E. D. Cuddy.
First Vice-Pres.—E. M. Meyer.
Second Vice-Pres.—Luke Tierman.
Secretary—Charles Steinmetz.
Treasurer—Benj. Kolbenschlag.
Sergeant-at-Arms — Martin Steinmetz.

BOARD OF DIRECTORS

W. A. Widenmann.
Wm. R. Seaman.
W. A. Heckert.
Wm. F. Wehrman.
A. Artmaier.
Alex Hoell.

Business Promotion

In an address on the Promotion of Business Activity, A. E. Shanau said:

"This matter of co-operation between the operator, distributor, and contractor is a big subject. The objective of co-operation is something that everybody can share in.

"The big co-operative activities, the big things that have been put over in a co-operative way have been centered around the idea of more business for everybody. If we can work out a program that will mean more business for all, we can all take our chances.

"To get more business naturally the easiest sort of promotional development is where you have a specialty; in other words, where you have something made up ready to sell and you can take it out and show it to the other fellow and demonstrate the things it can do for him to make him want to buy it.

"In your business, there are very few things that would come under the head of a specialty. It is a little more difficult in your business to develop a co-operative promotional activity, because you have no specialty which can be advertised, promoted, and sold with a lot of sales

(*Continued on page* 59)

Air Conditioning Section

Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

WHAT we think is destined to be a notable series of articles starts in this issue. The subject is altering existing hot water, steam or vapor plants to air conditioning-boiler systems.

- - - - These articles, we think, are really needed if correspondence is any indication of the amount of work of this kind our contractors are doing all over the country.

- - - - The series starts from scratch. We assume that the only thing you know about such systems is that a boiler supplies heat through cast iron pipe and not tin pipe leaders. Much ground will have to be covered because, as we point out, the problems of satisfactorily designing and installing such systems calls for knowledge of new apparatus and different ways of doing things.

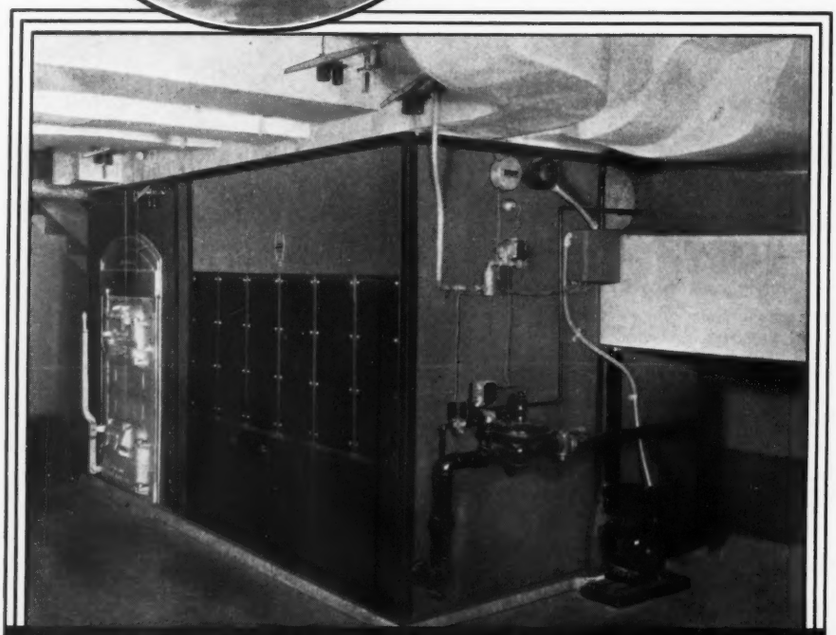
- - - - We shall be very glad to get your comments, suggestions or questions.

Sunbeam Dealers

MAKE SALES LIKE THIS ONE!

Opposite is shown the Shaker Heights, Cleveland, Ohio, residence of M. J. Bernet, Nichols and Fritzsche of Cleveland, Architects. The Sunbeam Air Conditioning System for this home was engineered by The Fox Furnace Company and was sold and installed by Jacob Halter & Sons of Cleveland, Ohio. The contract for air conditioning this home in winter amounted to many thousands of dollars.

This is a Zone Control installation with 20 Zones. Virtually every room has its own thermostat, and individual control of temperature. Either one of the two Sunbeam Air Conditioners has sufficient capacity for the building. The owner can switch from the Gas-Fired Unit to the Coal-Fired Unit at any time, should he elect. A 3 ton refrigerating unit, installed under a separate contract, is connected to the System to provide dehumidification and cooling of a limited number of rooms in summer. Sunbeam Winter and Summer Thermostats regulate the system all the year 'round. The same ducts that distribute the warm, conditioned air in winter, also distribute the cool, conditioned air in summer.



SUNBEAM
WARM AIR FURNACES AND AIR CONDITIONING UNITS

Here is a list of the Sunbeam Air Conditioning and Sunbeam Control Equipment which the Sunbeam Dealer sold for the System illustrated opposite:

- **One Sunbeam Gas Fired Air Conditioning Unit, complete.**
- **One Sunbeam Coal Fired Air Conditioning Unit, complete.**
- **One Sunbeam Spray Humidifier with Humidistat for each Sunbeam unit.**
- **One Complete Set of Sunbeam Controls for each Unit—Limit Switches, Fan Switches, Electric Valves and Relays.**
- **20 Zone Thermostats.**
- **20 Duct Damper Motors.**

If plans for a mansion in your community are now being drawn, there is a Sunbeam Unit that will Air Condition it—and help you obtain the sale and profit. If you have a prospective buyer in a four room cottage, there is a Sunbeam 18 inch gravity furnace, pipe and pipeless, that will net you another profitable sale. No home is too large or too small for Sunbeam Heating and Air Conditioning Units, which are designed for coal, gas or oil. Return the coupon for complete details and the name of the Jobber near you who carries a complete stock of Sunbeam Furnaces.

MORE FURNACE DEALERS SELL SUNBEAM FURNACES AND AIR CONDITIONING UNITS THAN ANY OTHER KIND.

THE FOX FURNACE COMPANY, Elyria, Ohio

A Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

The Fox Furnace Co., Elyria, Ohio
We are interested in the complete line of Sunbeam Furnaces and Air Conditioning Units. Please send descriptive literature and the name of the Sunbeam Jobber who serves our locality.

Name .....
Address .....
City and State A-7

THERE'S NEVER ANY GUESSING

IN

"GENUINE DETROIT" QUALITY

Here in this special high temperature research apparatus—accurately controlled within plus or minus 5° — metals can be subjected to a temperature as high as 1800° in a non-oxidizing atmosphere, to determine whether or not they can meet the demands of "Genuine Detroit" quality. Positive facts are necessary in developing products up to the "Genuine Detroit" standard.

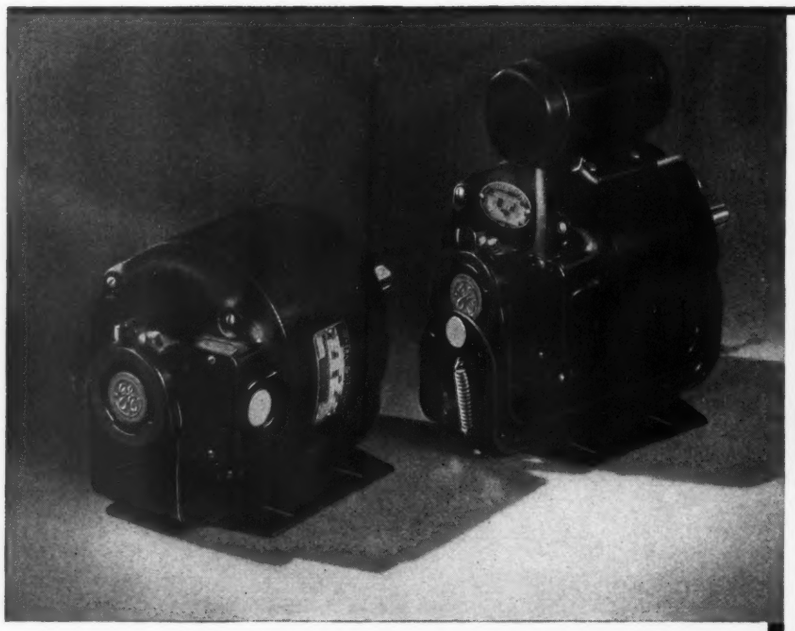
DETROIT LUBRICATOR COMPANY

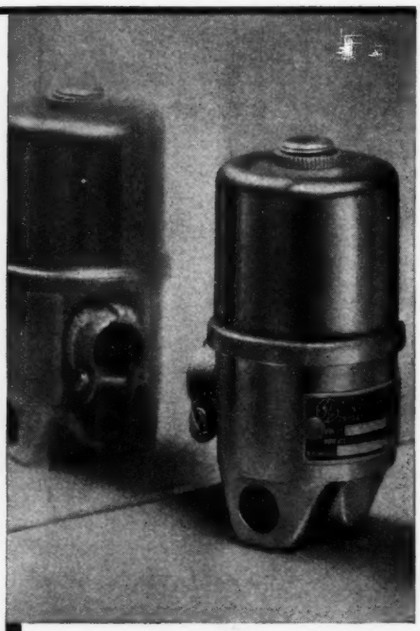
DETROIT, Mich., U. S. A.

Canadian Representative: Railway & Engineering Specialties, Ltd., Montreal, Toronto and Winnipeg

"GENUINE DETROIT" Controls and Valves

REDUCE SERVICE COSTS WITH THE RIGHT ELECTRIC EQUIPMENT





"CARE-FREE" MOTORS . . . EASY TO INSTALL . . . SIMPLE TO MAINTAIN . . . DEPENDABLE

TYPE KH resistance, split-phase motors for belt-driven fans and blowers requiring up to 1/4 hp.; Type KC motors for the same class of service where the horsepower required is from 1/3 hp. up (in the fractional-hp. range). Both have these advantages:

LARGE OIL SUPPLY—Lubrication attention minimized—once-a-season oiling is all that's needed.

BELT TIGHTENER (optional) . . . This new, radically different belt tightener depends on torque, and not on springs, for its action. It maintains just sufficient tension to prevent slippage, because the tension is proportional to the load. It eliminates service calls for belt tightening or premature replacing. Consider the saving in service costs alone. Standard-base slots make easy adjustment possible where the automatic belt tightener is not supplied.

CUSHIONED POWER—Sets a new standard of quietness. Durable, springy rubber mounting, securely clamped in place, isolates vibration—eliminates unnecessary noise. Provides other advantages equally valuable to you.

NEW, ELECTRICALLY OPERATED VALVE SMALL . . . COMPACT . . . LOW-PRICED

Ideally suited to air-conditioning needs, this new electric valve will handle water or low-pressure steam quickly, easily, and economically, by remote control.

It provides positive operation over a wide range of pressures and temperatures. It is economical—it uses only 7½ watts at 110 volts, 60 cycles. Its parts are sealed in steel—no stuffing box. A handy, built-in terminal box saves installation expense. A convenient metering pin provides 50-per-cent-flow regulation—no extra valve is needed. If you have a large task for a little valve, this valve will save you money.

To maintain and protect your reputation for service and dependability, it will always pay you to insist on the highest quality when buying electric equipment. For quality and correctness of design and manufacture, order General Electric wire and wiring devices along with your motors, control, and transformers.

GENERAL ELECTRIC

General Electric Company
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Please send me the following publications, as checked:

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Also, please place me on your mailing list to receive regularly your new information service covering small motors for air conditioning.

070-40

- ☐ GEA-1276A, Type KH Split-phase Motors.
- ☐ GEA-977C, Type KC Capacitor Motors.
- ☐ GEA-1847A, Solenoid Valves.
- ☐

There has been much talk lately of all air conditioning being the warm air heating contractor's business. In other words, we ought to air condition houses heated by steam, hot water or vapor. We agree, we should do this work—but wanting or claiming this work is only the start. We must know HOW. This article is the first of a series dealing with the conversion of existing boiler plants to air conditioning systems. We will assume that the boiler is already in place and that our job is to install the fans, filters, heat transfer sections, duct work and controls. We find much information missing, particularly for small houses, so an American Artisan test house will be set aside for investigation of this system.

Air Conditioning for Radiator Heated Houses

By Platte Overton

THE design of air conditioning systems using boilers which are already in place and in good condition should be considered by the warm air heating contractor as a problem worth serious study. It is not sufficient that we take such jobs and lightly assume that because we are accustomed to handling air we know all about designing systems having a source of heat supply other than a furnace.

The truth is that while there is nothing theoretically or practically wrong with boiler-air conditioning systems many problems have to be carefully worked out when such systems are installed in small houses. Basically, of course, the fundamental calculations for heat loss, air change, supply and distribution, recirculation and so forth are identical, it is the system and the apparatus which offer the tough problems.

Basic Problems

What, you may ask, are these problems that we have not encountered in air conditioning with a furnace?

First, we should remember that a furnace is a highly flexible piece of apparatus. If we design an air conditioning system on a register air temperature too low for some extreme conditions all the owner has to do is increase his combustion rate and thereby raise the register air temperature. Bonnet temperatures of 100 to 300 degrees or more are possible. Where hot water or steam is the heating medium for

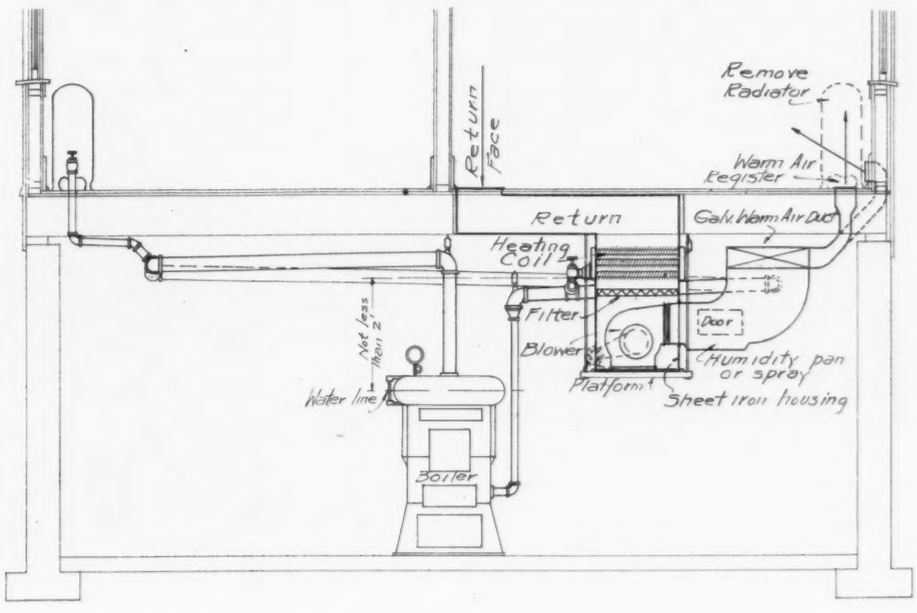

Fig. 1—Sketch of a typical converted air conditioning installation, using existing boiler, some of the radiators, recirculating system and conditioning apparatus.

the air, temperatures are confined to a maximum of 120 degrees for steam and 100 to 110 degrees for hot water. Higher temperatures are possible with the use of high pressure boilers, or the installation of oversized coils with low velocities, but high pressure boilers are not practical for homes and oversized coils are expensive, and require considerable power consumption to force air through them.

Second, the apparatus we must use is different from the apparatus we are accustomed to—it must be applied in different ways—its characteristics vary widely and must be known and understood.

Third, the problems of installation require new methods and practices. For example—having radiators already in place shall we remove all radiators, or shall we leave some in and if so which ones? Is the boiler large enough? Can we use it as it stands in the basement or must we make alterations and changes?

How to Identify Systems

It is essential that the contractor have a sound knowledge of the fundamental terms, definitions and formulas for the basis of calculating heating requirements where air is the heat carrying medium and the actual air heating element is a coil, which in turn is heated by steam or hot water.

The contractor should be able to differentiate between steam, vapor, vacuum vapor or hot water heating systems by a check of the radiators, boiler or piping system, as they all vary more or less.

Larger coils are required to heat the same amount

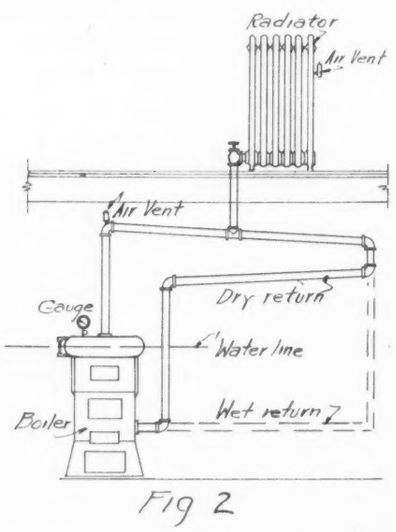

Fig. 2—Sketch of typical "one pipe" steam system showing details which identify this system. Steam enters and condensate returns through a single pipe. Note pitch of feeder pipe.

of air with hot water than would be required by steam, and even the coils used on steam systems will vary with the pressures and types of steam or vapor plants used.

The contractor who installs air conditioning in radiator heated homes will find that he must deal with one of three types of systems. They are—hot water, steam and vapor.

Steam Plants

A vapor system is, of course, a steam heating plant, but differs from an outright steam installation in that it functions at pressures at or below atmospheric. When we refer to a steam system we generally indicate a system that must be maintained at from 1 to 5 pounds of steam pressure in order to produce heat in the radiator. Such systems are sometimes called "one pipe relief" or "one pipe circuit." Such a system is shown in Fig. 2.

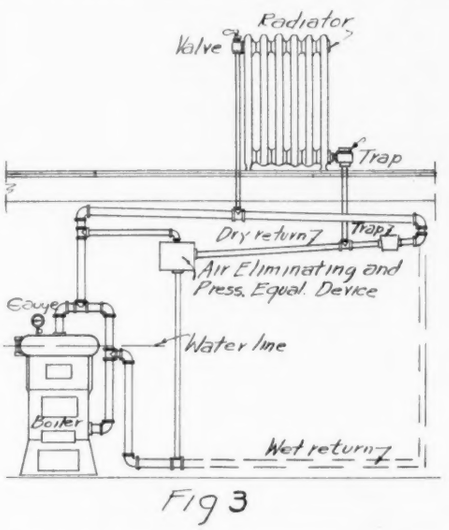

Fig. 3—This is one type of "vapor" system. In general, this is a steam plant designed to operate below atmospheric pressures, hence water can boil below 212 degrees. Considerable apparatus is required to trap out steam, separate water from air, etc.

The steam leaves the boiler and enters the main that runs around the basement. The end of this main is carried back to the boiler. The radiators have only one pipe connection through which the steam must enter and the condensation pass out as a counter flow. The main is pitched down from the boiler and after the condensation has returned to the main from the radiator branch it travels with the steam around the circuit before returning to the boiler.

Vapor Plants

Fig. 3 is a vapor system. There are many types of vapor systems and Fig. 3 is intended to be merely typical. Vapor systems generally have "dry returns." The steam is supplied at the top tapping of the radiator and such radiators are of the hot water type. The supply valve has a graduated control so that variable quantities of steam may be admitted. The condensation and air leave the radiator at the bottom through an automatic trap that closes when it comes in contact

(*Continued on page* 44)

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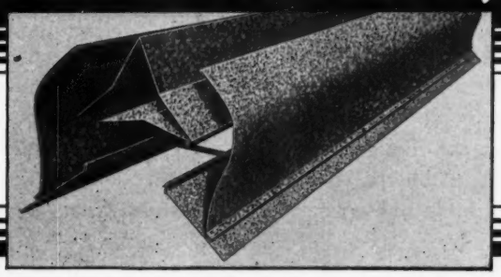

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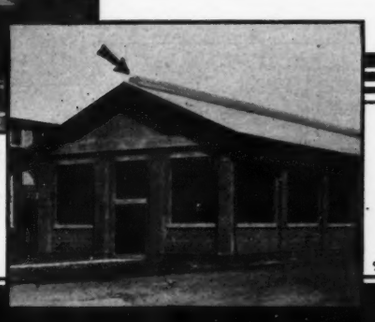

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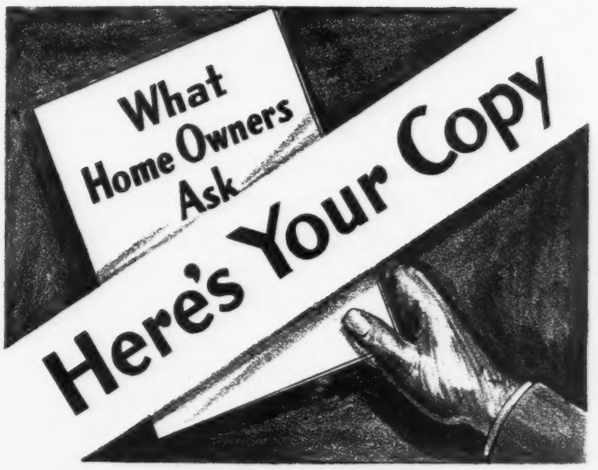

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Automatic Controls

This second article on continuous fan operation discusses variation number one wherein c. f. m. remains constant, fan runs all the time, register air temperature varies according to the condition of the fire. We also discuss the cost of power for continuous operation. The problems, advantages, troubles of this hookup are presented.

IN our June issue we began discussion of our fourth control system—wherein the fan runs all the time. We published the general advantages of this type of operation as found by contractors and also by the research staff at the Research Residence in Urbana.

In setting up the basis for discussing this system we stated that continuous operation of the fan offers three variations as follows:

1. Fan runs all the time—c.f.m. remains constant—register air temperature varies according to the condition of the fire which is controlled by the room thermostat.

2. Fan runs all the time—c.f.m. remains constant—register air temperature is mechanically varied according to the immediate needs of the house by mixing cold and warm air at the furnace plenum by means of mixing dampers.

3. Fan runs all the time—c.f.m. is varied over two or more speeds by the use of variable speed motors or variable speed drives—register air temperature varies according to the condition of the fire which is controlled by the room thermostat.

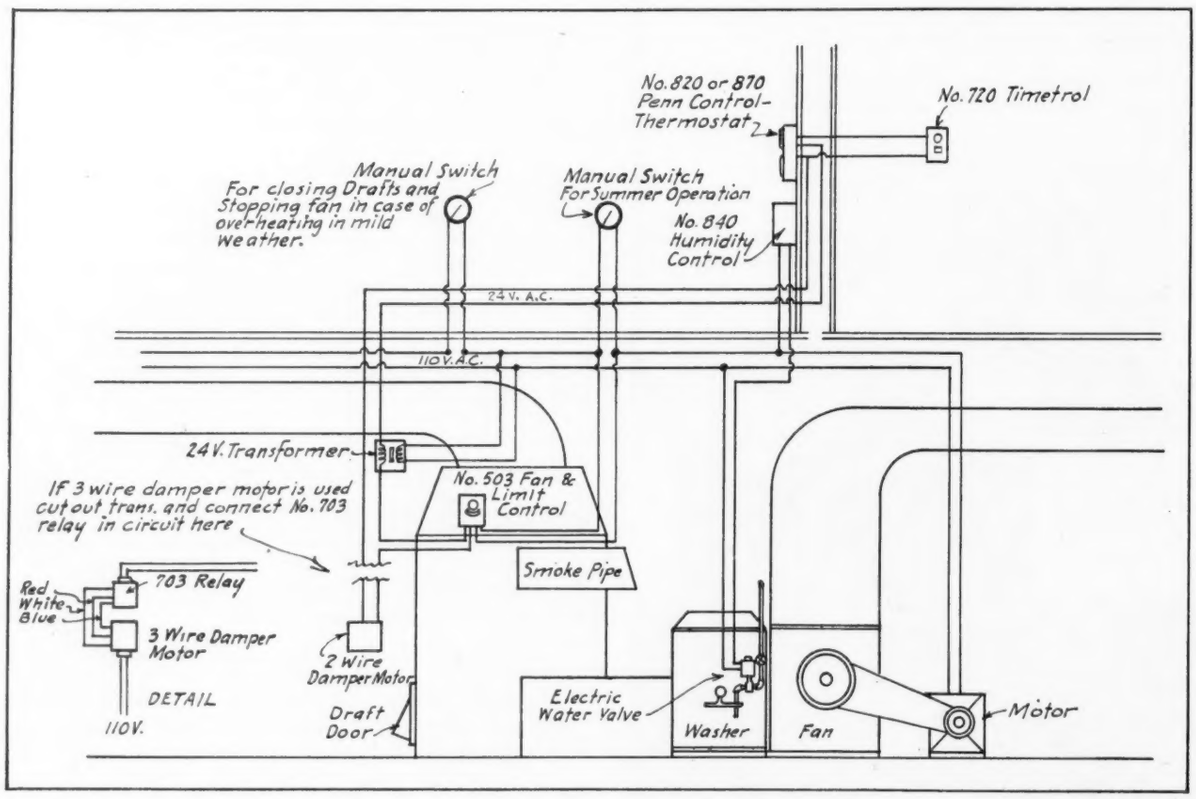
In this article we propose to discuss variation number one.

To begin, let us settle immediately that problem which, to our mind, has been the chief cause of the lack of popularity of continuous fan operation, namely —high cost of electric power.

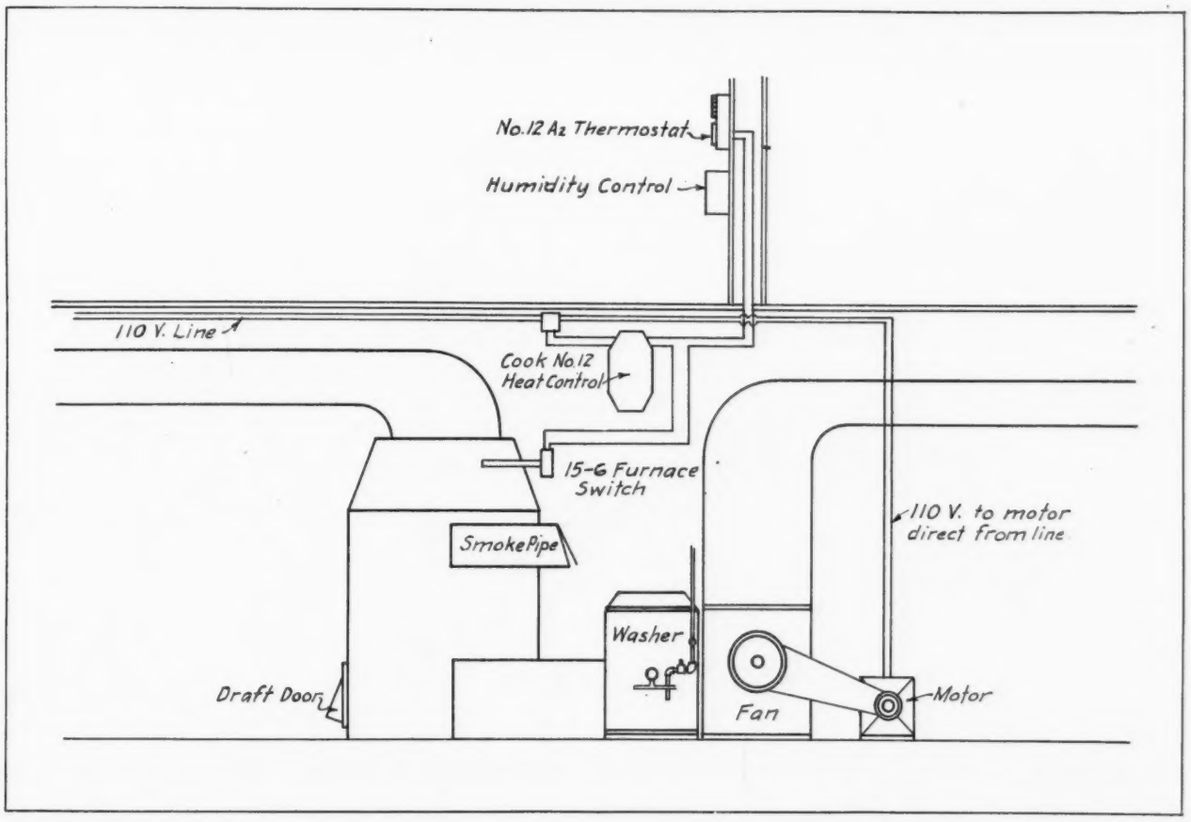
The most comprehensive data on this point were definitely established at the Research Residence in the tests on control systems. The research staff states:

"The power consumption of the fan in kilowatt-hours per day for various indoor-outdoor temperature differences is shown in Fig. 11-*a*. Some deviations

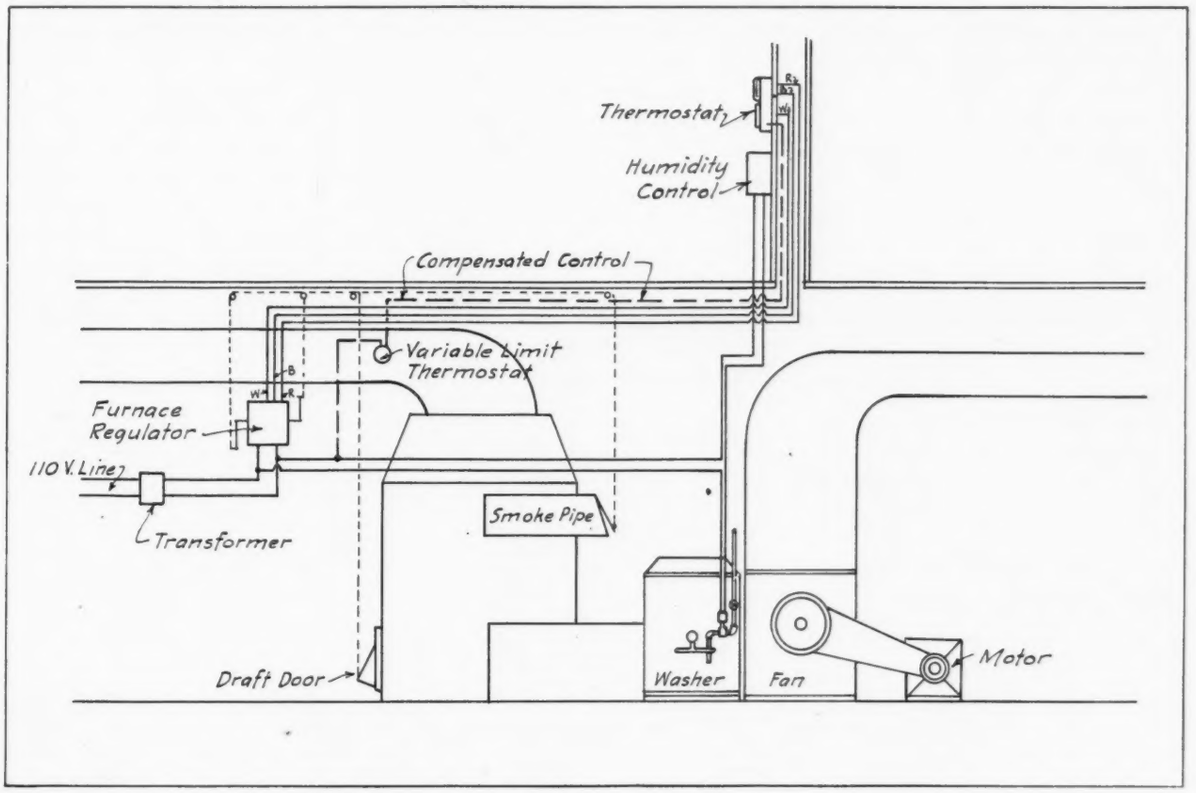
(*Continued on page* 40)



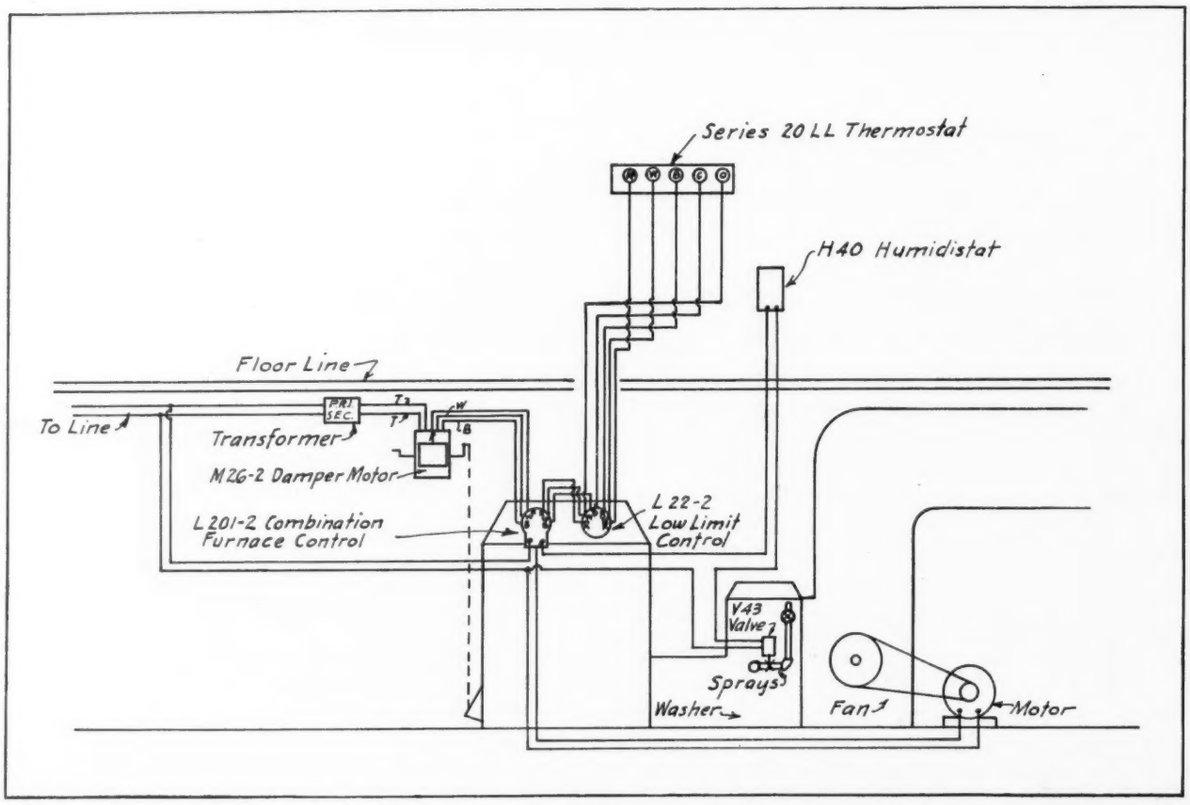
The diagram above shows Penn Electric Switch Company apparatus hooked up for continuous fan operation. Either two or three-wire motor can be used. Day and night operation is also used. A manual switch permits stopping the fan on temperature overruns. A bonnet limit control is used to place a "ceiling" on combustion.



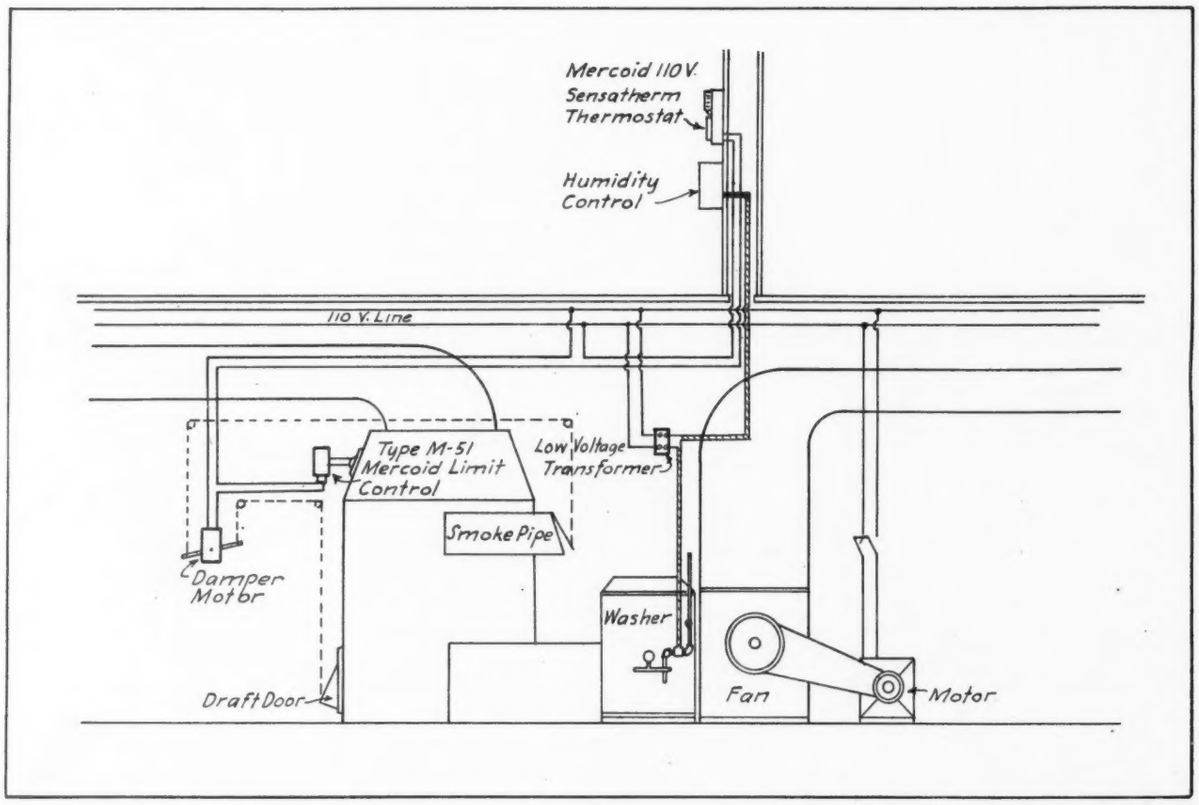
The diagram above shows Cook Electric Company apparatus wired for continuous fan operation using all high voltage and two wire instruments. A bonnet limit control is wired in series with the room thermostat to shut the drafts if bonnet temperatures exceed predetermined "high" temperatures. Simplicity of wiring is featured.



The apparatus above, by Barber-Coleman Company offers "compensated control" as a variation in constant fan operation. A variable limit thermostat is placed in a main duct and wired to the room thermostat. The duct thermostat reacts to air temperature change more quickly than the thermostat, shutting down the fire ahead of the time the thermostat is satisfied to prevent over-run.



Minneapolis-Honeywell Regulator Company suggests that with constant fan operation a low limit on air temperatures should be introduced and recommend a bonnet instrument which stops the fan when air temperatures get too cold. The room thermostat also has high limit function which checks the fire if temperatures overrun. A ceiling is also placed on combustion by the bonnet control so this system compensates for all kinds of weather without manual setting.



The diagram above shows a two-wire, high voltage hookup using instruments of the Mercoid Corporation also employing a bonnet limit control to place a "ceiling" on bonnet air temperatures. The room thermostat controls the fire excepting when too high air temperatures cause the damper to close through the limit control.

Comfort Cooling With Attic Ventilating Fans [Part 2]

In this second article of the series from University of Illinois tests several interesting points are raised—the close relationship between interior air and inside wall surface temperatures; how daytime conditions are determined by preceding night conditions; use of basement air; maximum useful air change; and so forth.

By A. P. Kratz and S. Konzo*

Influence of Methods of Operation on Conditions at Night

A study of the results involves the recognition of three separate natural subdivisions or objectives. These are: (1) the study of the conditions at night, between the times of opening and of closing the windows, as influenced by the weather and by the different methods of operation; (2) the study of the conditions in the house the next day resulting from the weather and from the conditions existing at 6 a. m. when the windows were closed; (3) the prediction of the effectiveness of a given method of operation, or of the cooling required, from the weather reports of a particular summer season.

Table 1 shows the volume of air delivered per minute and the number of air changes per hour produced by the different fan arrangements used, together with the power required to operate the fans. Fig. 4 shows characteristic curves for outdoor temperatures, indoor temperatures and indoor relative humidities for the least and most favorable methods of operation for two similar days. In the first case, shown by the upper curves in Fig. 4, 8 windows were partly opened at 9 p. m. and no fan was used. During the early morning hours of June 18 the outdoor temperature reached a minimum of 65.0° F, while the indoor air temperature did not fall below 75.5° F, or a difference of 10.5° F was shown. During these hours the indoor air temperature remained equal to or slightly above the temperature of the inside surface of the exposed walls, thus permitting no transfer of heat from the walls except by conduction to the outdoor air. The temperature of the air in the house rose to 84.5° F on June 18 following this cycle of operation at night.

In the second case, shown by the lower curves in Fig. 4, the lower sash of all of the windows, which were double hung, was opened to the fullest extent at 6 p. m. and the attic fan was used. The minimum outdoor temperature in the early morning hours of August

Table 1—Fan Data

Test Series	Designation of Fan	Windows	Time of Operation	Air Volume CFMa	Air Changes per Hour	Kilowatt-Hours per 12 Hours	Speed RPM
3	Basement	8 windows open	9 p.m. to 6 a.m. Night Air	1760	7.5	4.50	567
4, 5 and 6	Basement	All windows open c	6 p.m. to 6 a.m. Night Air	2142	9.1	5.40	567
4 and 6	Basement	Windows closed. Recirculation	Daytime	1482	6.3	4.20	567
7 and 8	Attic	All windows open	6 p.m. to 6 a.m. Night Air	3980	16.8	3.85	845
10	Attic	2nd story windows open only	6 p.m. to 6 a.m. Night Air	3980	33.6b	3.85	845

*Study of Summer Cooling in the Research Residence at the University of Illinois, by A. P. Kratz and S. Konzo. A. S. H. V. E. Journal Section, Heating, Piping and Air Conditioning, February, 1933, p. 115. Paper presented at the 40th Annual Meeting of the American Society of Heating and Ventilating Engineers, New York, N. Y., February, 1934.

a Based on density of air of 0.074 lb per cu ft.

b First story windows closed and only second story regarded as active.

c Basement air taken through basement door. Inlet duct open to basement.

12 was 64.0° F, nearly the same as in the first case, but the indoor air temperature dropped to 68.0° F as compared with 75.5° F for the first case. That is, the difference between indoor and outdoor temperatures was 4.0° F as compared with 10.5° F. During the whole night the temperature of the indoor air was distinctly below that of the inside surface of the exposed wall, thus permitting heat to be transferred from the walls to the air which was being removed from the house. The temperature of the air in the house next day rose to only 79.5° F before the windows were opened as compared to 84.5° F for the previous case.

In all cases, the temperature of the surface of the first floor ceilings and of the furniture remained practically the same as that of the indoor air of the room involved. The temperature of the surface of the second floor ceilings was usually from one to three degrees higher than that of the air in the room.

Predicting the Day's Conditions

From Fig. 4 it may be observed that conditions in the house at 6 a. m. when the windows were closed were directly dependent on the weather and the method of operation between the times of opening and closing the windows. Since the house was always closed and no fan was operated in the daytime, conditions in the house the next day were determined by the conditions existing at 6 a. m. and by the weather during the day. Inasmuch as these conditions at 6 a. m. were dependent on the method of night operation, the conditions next day were a reflection of the method of operation. But since the conditions at 6 a. m. could be considered as having been established by any independent means, and the resulting conditions during the day would be the same independent of the means required to establish those at 6 a. m., for purposes of analysis of the different methods of night operation the daytime conditions may be regarded as not directly dependent on these methods, and the attention may be concentrated on the part of the cycle included between the times of opening and closing the windows.

The effectiveness of any given method of night operation is directly indicated by the ratio of the rate of decrease in the indoor temperature to the rate of decrease in the outdoor temperature, and the relative effectiveness of the different methods could be compared by comparing these ratios. However, the rates of decrease are also proportional to the drops in temperature from the time that the indoor and outdoor air attain the same temperature, as represented by the crossing point of the two air-temperature curves shown in Fig. 4, to the times at which these two air temperatures each become a minimum. Since these temperature drops were useful in subsequent calculations, they were used as the basis of comparison, instead of the ratios of the rates of temperature decrease. These temperature drops are further useful in that with a known outdoor minimum temperature and a known or assumed temperature at the crossing point, they serve to establish the minimum indoor temperature that would be attained. That this minimum indoor temperature was also the same as the indoor temperature existing at the time that the windows were opened at 6 a. m. is shown by Fig. 5.

A comparison of the temperature drops, *A* and *B*, from the crossing point to the minimum outdoor and indoor temperatures for the different methods of night operation is shown in Fig. 6. The time of the crossing point was not always coincident with the time at which the windows were opened, and the temperature at the crossing point was somewhat influenced by the history between these two times. Hence in order to obtain the effect of the fan alone the comparison must be made

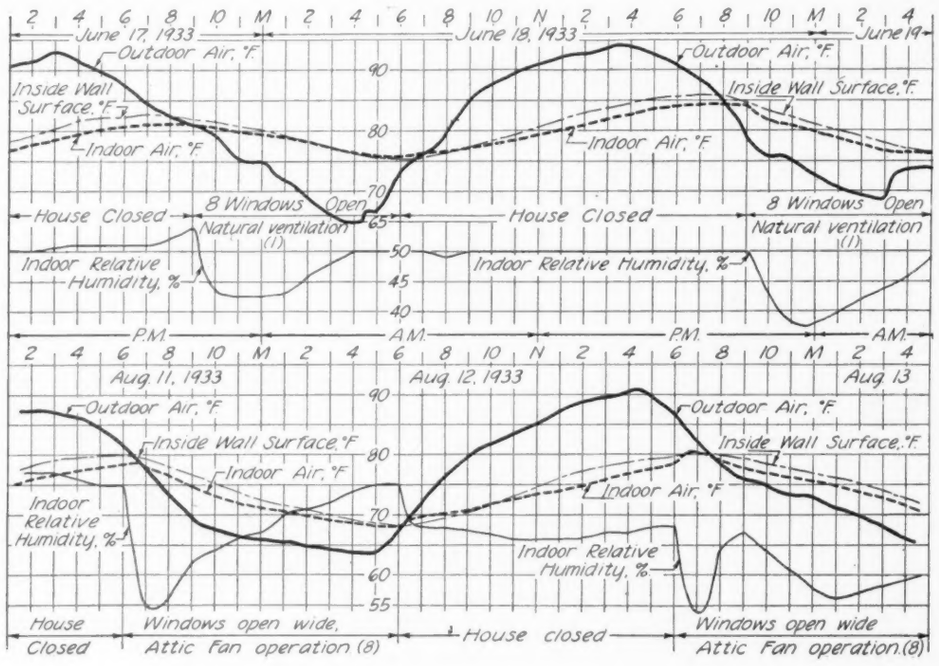


Fig. 4—Daily temperature cycles showing periods of night cooling with least and most favorable methods of operation

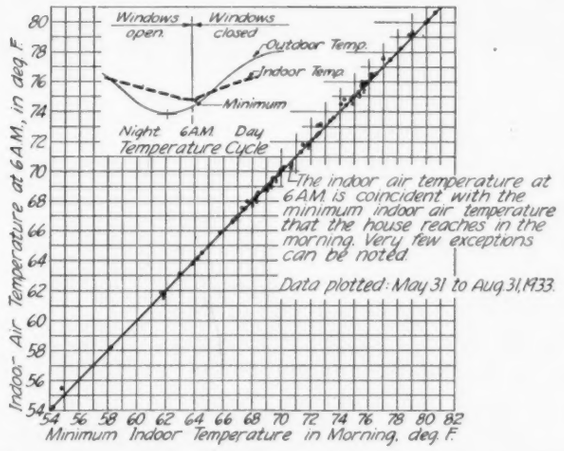

Windows open.
Windows closed
Outdoor Temp.
Indoor Temp.
Minimum
Night 6AM Day
Temperature Cycle
The indoor air temperature at 6AM is coincident with the minimum indoor air temperature that the house reaches in the morning. Very few exceptions can be noted.
Data plotted: May 31 to Aug 31, 1933.
Indoor Air Temperature at 6AM, in deg. F.
Minimum Indoor Temperature in Morning, deg. F.

Fig. 5—Indoor air temperature at minimum value at 6 a. m.

between two series for which the windows were opened at the same time and which differed only in that the fan was used for one and not for the other.

From Fig. 6 it is evident that *Series 1* in which 8 windows were opened at 9 p. m. was the least favorable since it gave the least drop in indoor temperature for a given drop in outdoor temperature. The house was stuffy and uncomfortable all night and the temperature was far too high for comfort the next day. A companion series, *Series 3*, run with the same schedule of window opening and with the basement fan delivering 1760 cubic feet of air per minute taken from outdoors, resulted in marked improvement, but did not entirely correct conditions.

From the experience with *Series 1*, it became evident that some advantage was to be gained by opening the windows earlier even if the outdoor temperature was somewhat higher than that indoors. *Series 2* was therefore run without a fan, but with all of the windows in the house opened to the fullest extent possible and in addition the attic door opened in order to obtain the advantage of the full chimney action of the heated air in the house. As shown by Fig. 6, this resulted in very marked improvement over the results from *Series 1*, and in considerable improvement over those from *Series 3*. Conditions in the house were quite comfortable at night and the indoor temperatures the next day were not unreasonable.

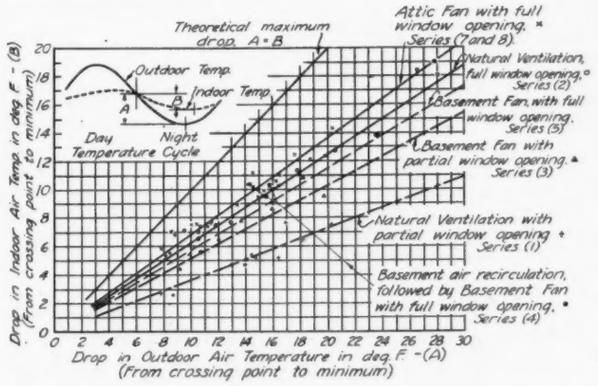

Theoretical maximum drop, A=B
Attic Fan with full window opening. * Series (7 and 8).
Natural Ventilation, full window opening.° Series (2)
Basement Fan, with full window opening. Series (5)
Basement Fan with partial window opening. ▲ Series (3)
Natural Ventilation with partial window opening + Series (1)
Basement air recirculation, followed by Basement Fan with full window opening. • Series (4)
Outdoor Temp.
Indoor Temp.
Day
Night
Temperature Cycle
Drop in Indoor Air Temp. in deg. F. - (B) (From crossing point to minimum)
Drop in Outdoor Air Temperature in deg. F. -(A) (From crossing point to minimum)

Fig 6—Curves of temperature drops for various methods of night air cooling in Research Residence (summer of 1933)

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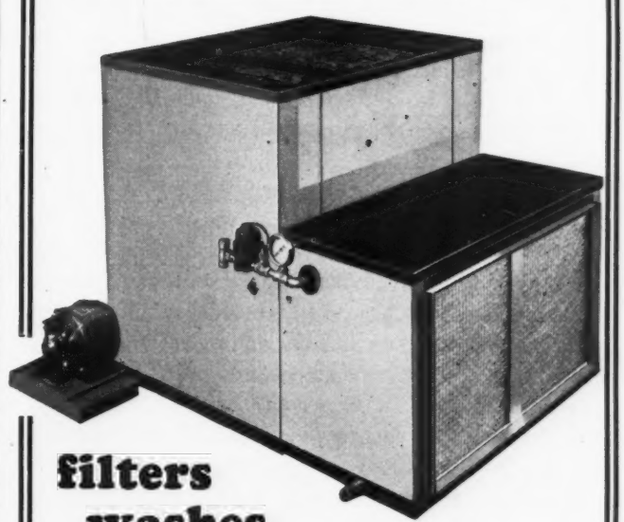

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Register Air Temperatures in a Continuously Operated Fan System

Every so often some one takes a long held and commonly accepted theory or practice and turns it inside out to demonstrate that we take too much for granted. For instance, register air temperature. We select some temperature to design to and that's the end of our thought on the subject. So S. Konzo, whom we all know, has taken register air temperature and turned it inside out. See what he gets.

By S. Konzo

Special Research Associate,
Department of Mechanical Engineering,
University of Illinois

IN THE design of a forced-air heating system one of the first assumptions that must be made by the designer is the value of register air temperature to be selected for design purposes. In a continuously operated fan system with constant air delivery, the register air temperatures will vary from day to day and from hour to hour, depending upon the heat demands made upon the heating plant by the outdoor weather conditions.

In extremely severe weather, for instance, when the room thermostat tends to raise the combustion rate to a point sufficient to supply the heat requirements, the average register air temperature will tend towards a maximum value. Conversely, in mild weather, when a low combustion rate is sufficient to heat the house, the average register air temperatures will tend towards a minimum value. In other words, with constant speed fan operation, the varying heat demands of the house are met by a constantly varying register air temperature. This change in average register temperature is a direct result of the changes in the combustion rate, which is regulated by the room thermostatic control.

Temperature Fluctuations

Although the average register air temperature is directly related to the outdoor weather conditions, the register air temperature may fluctuate above and below the average by a considerable amount, depending upon the sensitivity of the room thermostat, and whether or not a stack limit thermostat is used in the system.

With these few statements to describe the general operation of a continuously operated fan system, a more detailed study of register air temperatures will be discussed.

The following remarks pertain only to continuous, 24-hour operation of the fan, although some of the remarks apply equally well to intermittent fan operation. General practice and custom in the trade has established 135 degrees register air temperature as a reasonable one for basing design calculations. Hence, this value was used in the Research Residence forced-air heating plant to conform to general practice.

However, it will probably prove of great interest to consider those factors which would tend to make the actual register temperatures deviate from the expected or design temperatures. Two factors enter into the discussion—the first is the regain of heat from the vagrant heat losses from the casing, the smoke pipe, the chimney, and the duct system—the second factor is the effect of different air volumes circulated through the system.

Vagrant Heat Loss

In regard to the first factor, it is of interest to note in the Research Residence plant that due to the re-absorption of heat into the house from the so-called "vagrant heat losses," approximately 90 per cent of the heat liberated in the furnace by the combustion process was absorbed in the house to offset the heat loss from the structure. This matter of overall house efficiency has been repeatedly emphasized in the past, and it may be recalled that in the Research Residence this overall house efficiency was approximately 90 per cent for anthracite and gas fuels, and 75 per cent for bituminous fuel.

(Editor's Note—To amplify this statement of Mr. Konzo's we refer readers to Section 19, Bulletin No. 189, Engineering Experiment Station, University of Illinois, which says—"The loss of heat from the top of the chimney, when an inside chimney is used, is the only ultimate loss of heat from the house. By subtracting from 100 the percentage losses at the top of the chimney the overall efficiency of the house and the heating installation may be determined. When hard coal was fired, the overall efficiency ranged from 92 to 97 per cent, averaging 95 per cent for average weather. With soft coal, the overall efficiency averaged 75 per cent.")

Now consider an example in which the design value for efficiency at the registers is assumed as 60 per cent in a house where the heat loss calculations for the structure show 100,000 B.t.u. per hr. under

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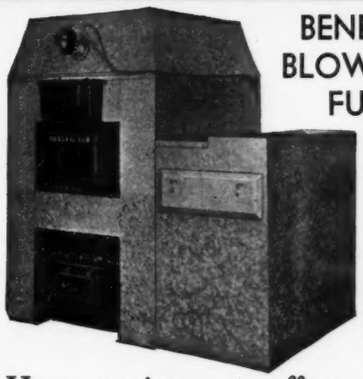

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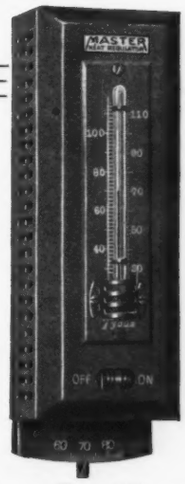

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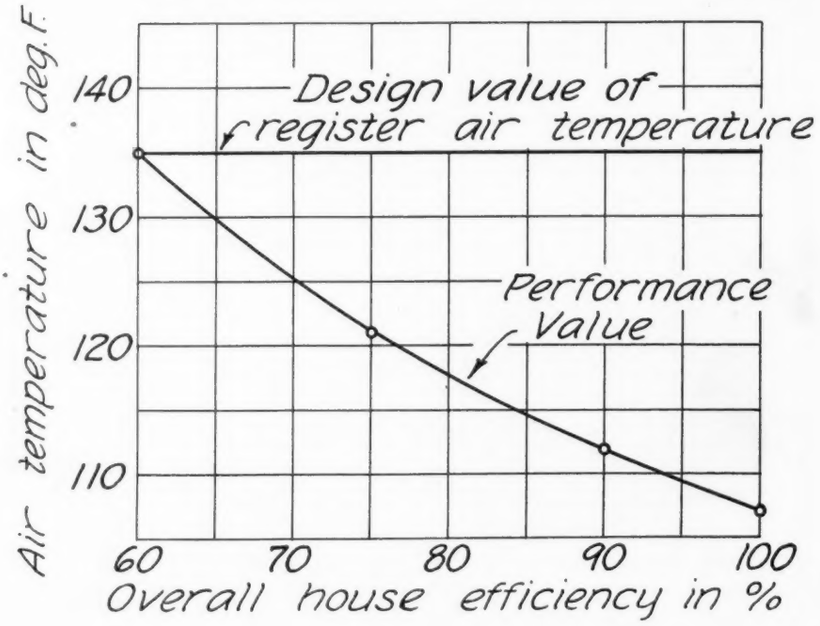

In the chart Mr. Konzo has plotted the design air temperature (135 degree) as a horizontal line. He has assumed that the overall house efficiency is 60 per cent. Hence at 60 per cent efficiency the actual and designed register air temperature will be the same. As overall house efficiencies increase the actual register air temperature required to heat the house falls off as shown.

zero weather conditions. Then the volume of air to be circulated per minute for 135 deg. register temperature is equal to $\frac{100\,000}{0.24(135-65)\times 60\times 0.067} = 1480$ c.f.m. at the register face or approximately 1320 c.f.m. at the cold air inlet to the fan.

(Editor's Note—The above paragraph introduces, we believe, a new thought. No data sheet we are acquainted with contains any provision for a register efficiency less than 100 per cent. It is true that on some data sheets a factor for exposure is added; on others a factor for safety is added; but in no instance do these factors exceed 20 per cent. In Bulletin No. 189, Experiment Station, University of Illinois, the research staff reported—"Of the heat carried in the air leaving the furnace, a portion was lost by radiation and convection from leaders and stacks. This loss was found to be exactly 25 per cent of the heat available at the bonnet. With hard coal, it is indicated that whereas 59 per cent of the heat of the fuel was available at the bonnet only 44 per cent finally was delivered at the registers. For soft coal corresponding values were 41 per cent available at the bonnet and 31 per cent delivered at the registers.")

The heating unit as finally selected would have a fan capable of delivering 1320 c.f.m. and a furnace capable of delivering 166,700 B.t.u. per hr. If the calculated conditions were exactly encountered in practice, then for zero weather the register temperature should be 135 degrees. Under the most favorable service conditions, however, due to the effect of re-absorption of vagrant heat, a heat liberation of approximately 111,000 B.t.u. per hr. at the furnace unit will be sufficient to meet the demands of the house if anthracite or gas is used as fuel. If we assume that the actual efficiency at the register is 60 per cent then only 66,700 B.t.u. delivery at the register will heat the house, whereas the calculations were based on a 100,000 B.t.u. loss. The difference of 33,300 B.t.u. is that contributed by the "vagrant heat." Since the fan which was selected delivers 1320 c.f.m. the heating system will automatically compensate and prevent overheating of the house by delivering the air at a lower temperature; which in this example will mean a register temperature of approximately 112 degrees.

Fuel Effects

In a similar manner, under very favorable operating conditions with bituminous coal as fuel, the overall house efficiency will be approximately 75 per cent. Under this condition a heat liberation in the furnace of 133,300 B.t.u. per hr. will be sufficient to supply the 100,000 B.t.u. per hr. heat loss from the house. The heat delivered at the registers will be 60 per cent of 133,300 B.t.u. per hr., or 80,000 B.t.u. per hr., and the "vagrant heat loss" will be 20,000 B.t.u. per hr. In this case, an air delivery of 1320 c.f.m. will result in a register air temperature of 121 degrees F. instead of 135 degrees F. which was assumed for design purposes.

To recapitulate then, the discrepancy between the calculated design values and the actual service values, due to this influence of heat re-absorption, will be of the following magnitude:

	Design	Actual Anthracite or Gas	Actual Bituminous
Heat loss, calculated	100,000 B.t.u./hr.	100,000	100,000
Overall house efficiency	60%	90%	75%
Heat liberated in furnace	166,700 B.t.u./hr.	111,000	133,300
Heat at register	100,000 B.t.u./hr.	66,700	80,000
Vagrant heat	None	33,300	20,000
Register efficiency	60%	60%	60%
Air volume	1320 c.f.m.	1320 c.f.m.	1320 c.f.m.
Register temperature at zero weather	135 deg.	112 deg.	121 deg

The values listed in the table are shown in the figure accompanying the text. The deviation between design register air temperatures and actual register air temperatures is shown for various overall house efficiencies. If the overall house efficiency were 60 per

cent then the actual and design temperatures would coincide, whereas for 100 per cent overall house efficiency the deviation will be largest.

In other words the higher the overall house efficiency for any house the further will the actual conditions deviate from design conditions toward the safer side. That is, whatever gain that comes from this source of re-absorption of the "vagrant heat loss" will be in the nature of an added factor of safety. Since its magnitude is not predictable it is safer in design practice not to count too heavily on this regain and is in most designs totally neglected.

Whether one counts on it or not, however, this regain of heat always enters into the problem of register temperatures. If the designer were fully aware of the possible regain to be expected in any installation it might be feasible to base the design temperature at a value higher than 135 deg., say 155 degrees, and expect the actual temperatures to be much less than this value, under extreme weather conditions.

Air Volumes

The second factor, which is of equal importance, is the matter of air volume circulated. If in the example just cited, the pressure resistance in the duct system is greater than that predicted, the amount of air delivered by the fan in the actual installation will be less than that expected. The system, in its attempt to heat the house, will compensate for this reduced air volume by increasing the combustion rate thereby increasing the register temperature.

As an example, let us assume that the same conditions that were described in the first case hold in this case, except for a lowering of the air volume from 1320 c.f.m. to say 1100 c.f.m. The actual register air temperature then will be approximately 121 degrees instead of 112 degrees F. In other words, when the actual pressure losses in the duct system are greater than that assumed in the calculations for selecting fan size, the decrease in air volume in the actual installation over that for design conditions, will tend to raise the register air temperature.

In any installation both of these factors, namely the reabsorption of heat and the difference in air volume, are bound to have some influence. In a well constructed house having tight basements, with a high efficiency fuel burner for which the overall efficiency may be high, it may be feasible for the designer to base his calculations on a register temperature greater than 135 deg. knowing full well that the actual register temperature will probably be lower than the assumed temperature. On the other hand in those installations having intricate and complicated duct systems in which the pressure losses may be higher than predicted it is well to know that any decrease in air volume from design values will tend to raise register temperatures. These are matters which concern every designer, but as to whether they should be given consideration in any system should be left to his discretion.

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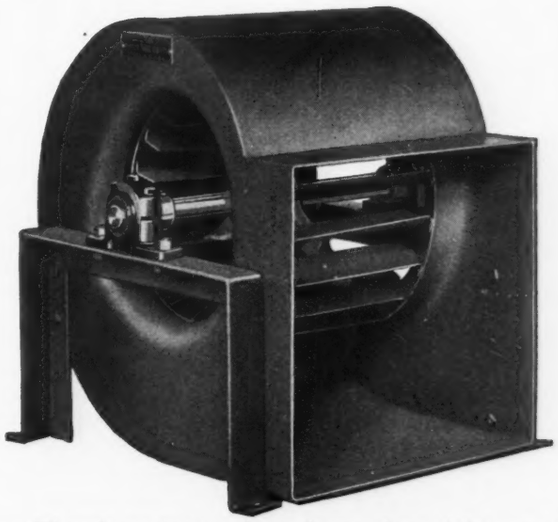

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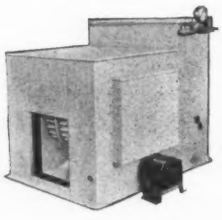

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(*Continued from page* 30)

of the points from the curves may be explained by the fact that some variations in the heat load on the house, caused by wind, sun, and rain, can not be expressed directly in terms of indoor-outdoor temperature differences. Most of the deviations, however, were the result of the factors discussed in the preceding paragraph. Hence, the trend of the points has been represented by a mean curve, and by two boundary curves indicating the probable range of deviation attributable to variations in the condition of the fuel bed and in the setting of the bonnet thermostat. With these restrictions, it may be observed that for intermittent operation, the power consumption of the fan motor was more or less independent of the type of control and increased as the indoor-outdoor temperature difference increased. This increase was from approximately 0.4 kilowatt-hours per day at 20° F. difference to approximately 3.0 kilowatt-hours per day at 60° F. difference. On the other hand, the power consumption for continuous fan operation was not greatly influenced by the random factors mentioned and remained practically constant at 3.6 kilowatt-hours per day over the whole range of indoor-outdoor temperature differences. It may be further observed that the power requirements for both continuous and intermittent operation became identical at an indoor-outdoor temperature difference of about 64° F.

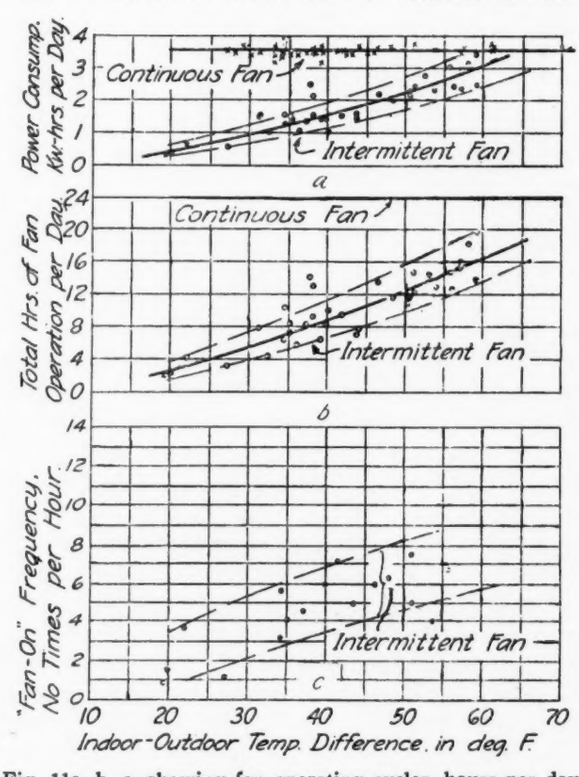

Fig. 11a, b, c, showing fan operating cycles, hours per day running time, and power consumption.

"The total number of hours that the fan was actually running during a 24-hour test period, as determined by means of a self-starting electric clock included in the fan circuit, is shown in Fig. 11-*b*. At an indoor-outdoor temperature difference of 64° F., at which the power requirements for continuous and intermittent operation became the same, as shown in Fig. 11-*a*, the total number of hours of operation per day was 18 for intermittent operation as compared with 24 for continuous operation. This indicated that for the same number of hours of actual running the fan motor consumed more power when running intermittently than when running continuously. This effect has been attributed to the extra load required to start the motor.

"The amount of the extra load imposed by starting the motor is shown in Table 1. The kilowatt-hours per hour of actual running time, was obtained by dividing the kilowatt-hours per day shown in Fig. 11-*a* by the total number of hours of running time shown by Fig. 11-*b*, at the corresponding indoor-outdoor temperature difference. For continuous operation this remained constant at a value of 0.150.

Table 1—Power Consumption Per Hour of Actual Running Time

Indoor-Outdoor Temperature Difference Deg. F.	Kilowatt-Hours per Hour		Increase Due to Starting Load Per Cent
	Continuous Fan Operation	Intermittent Fan Operation	
20	0.150	0.155	3
40	0.150	0.177	18
60	0.150	0.190	27
64	0.150	0.196	30

"From Table 1 it is evident that in average weather, or at an indoor-outdoor temperature difference of 40° F., the power requirement per hour of running time was 18 per cent greater for intermittent operation than it was for continuous operation. In severe weather, or at an indoor-outdoor temperature difference of 64° F., the starting load constituted an additional load of approximately 30 per cent of the normal running load. The power for starting is influenced by the type of motor and it is possible that if a split-phase or capacitor motor had been used the power for starting would have been greater.

"Fig. 11-*c* shows the average number of times the fan was operated per hour in order to maintain the house temperatures, as well as the increase in the number of cycles as the load demand was increased. Under conditions of normal heating demand of the house it was found that a frequency of *fan-on* cycles of between four and eight times per hour gave satisfactory performance. Higher frequencies would tend to give closer regulation of the room temperature but the numerous starting-up periods might be detrimental to the fan and motor equipment. On the other hand, frequencies less than four times per hour in normal heat-

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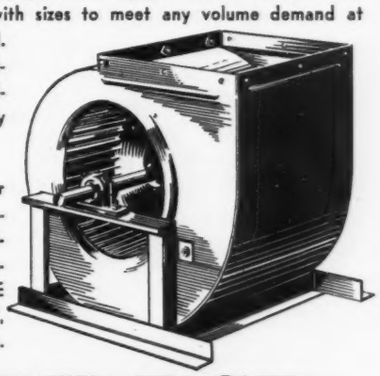

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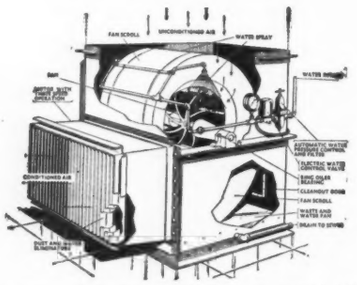

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ing weather did not give satisfactory regulation and equalization of room temperatures."

With constant fan operation obviously there is only one problem of temperature settings for instruments (the limit control) and *the real problem of operation consists of handling the air at the temperature which issues from the register.*

We suggest that the last paragraph be read again. Remember that in variation number one the room thermostat controls the fire. When the room cools the thermostat calls for heat and immediately opens the draft door. When the thermostat is satisfied the draft closes. In the meantime the fan runs along delivering a constant c.f.m. from the registers. The variable in this system is, then, the register air temperature. When the draft is open the register air temperature rises. When the draft is closed the register air temperature drops.

To complete the picture let us think of the operation in terms of cycles of the draft operation. Let us begin during the early morning warming up period. We will presume that the thermostat has been set down during the night to some temperature such as 65 degrees. In the morning the thermostat is increased to 72 degrees and immediately the draft door is opened.

If the weather is mild and the furnace is responsive the house temperature will rise rapidly and in the course of say half an hour the temperature reaches 72 degrees and the draft closes. During this warming up period bonnet air temperatures will have increased from 250 degrees to 300 degrees (see operating chart June issue) and the flue temperature will have risen from 100 degrees to 300 degrees.

This increase in combustion and furnace temperatures may or may not result in over-running the room thermostat depending on the ability of the house to absorb heat.

This brings us to the advantage of a fire limit control wired in the room thermostat-damper motor circuit. Such a control places a "ceiling" on the fire temperature. When this ceiling is reached the draft closes and the fire "coasts" until the bonnet or stack control "low" setting is reached whereupon control is returned to the thermostat, which if not satisfied again opens the draft.

Just where to set this limit control depends first on its location. If located in the bonnet tests will determine the high temperature which permits heating of the house to progress without interruption and also determine the low setting where the control of the fire should be returned to the room thermostat to prevent any lag in progressive heating.

The required differential may be 25 or 50 or 75 degrees and will have to be determined by actual test.

If this limit control is placed in the stack the same care in selecting settings must be used and of course the settings will be much higher (perhaps around 400 to 600 degrees). It might be well with either the

stack or limit switch to change the range in mild and severe weather—increasing the range as the weather gets colder.

The question is often asked about this system—what happens when the draft is closed for long periods; does not this system introduce air which is too cold?

The answer is yes, the system may under certain conditions. For example in the research residence tests showed that on constant operation of the fan the register air temperature dropped to as low as 90 degrees and often averaged 90 or 120 degrees for considerable periods of time. If 90 degree air is introduced at high velocity in the living zone it will feel cold and give a sense of chill.

One remedy is to place another control instrument in one of the ducts or branches and set it at the lowest temperature considered comfortable. Should the air temperature drop to this low setting the instrument will stop the fan.

Another remedy is to use high side wall registers because with the air stream passing above the heads of the occupants colder air may be introduced without the sense of chill.

Where the system is a remodeled job and the old registers (or at least their old locations) are to be used, high side wall registers may not be feasible and the baseboard or floor registers must be used. In this case we have some additional data from the Research Residence. It was found at the residence that velocities as high as 800 feet per minute at the registers can be used providing diffusers and louvres are employed. The louvres direct the stream of air downwards at an angle of about 45 degrees to the floor while the diffusers throw the stream out in the shape of a fan.

The net result is that the initial 800 foot velocity is reduced to about 100 or 200 within 18 inches of the register and the air stream is made to hug the floor for approximately one-fourth to one-third of the width of floor in front of the register.

It should be remembered, however, that the very operation of this system tends to act as its own "low limit" control. For instance, if the room thermostat is satisfied and the draft stays closed for a long period of time the fan blows cooler and cooler air into the house. Eventually the air reaches a temperature where it causes the thermostat to call for heat.

A word of caution might be introduced on the room thermostat. The location, naturally, is important. It is, of course, assumed with constant fan operation that the designed air change and circulation will be maintained uniformly throughout the house. The thermostat location should be indicative of an average condition—not directly in the path of the air flow; not isolated in a remote corner; not in a room subject to wide change due to sun effect, etc. Furthermore, the thermostat should be sensitive. It should be remembered that the thermostat is depended upon to control the fire and frequent openings and closings of the draft are very important in this system.

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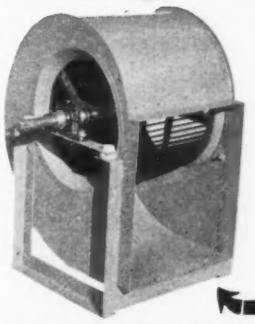

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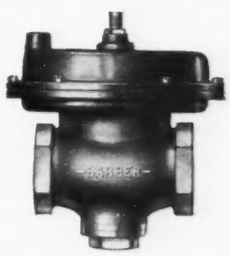

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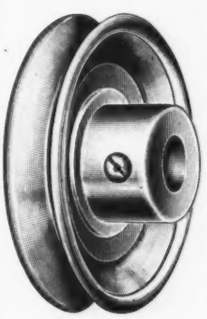

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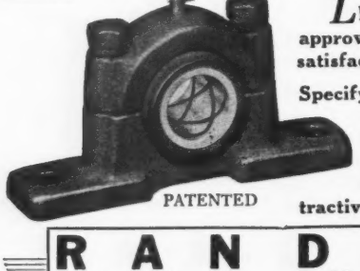

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Boiler Air Conditioning

(*Continued from page* 28)

with steam, hence the returns carry only air and water.

A purely vapor system is a system open to the atmosphere at the receiver or regulator in the basement, but in other respects is closed to the atmosphere, as no air valves are used on the radiators. A float vent valve is placed at the end of the dry return line and this valve allows the air to be vented from the system into the basement while the water returns to the boiler. The air is driven out of the system when

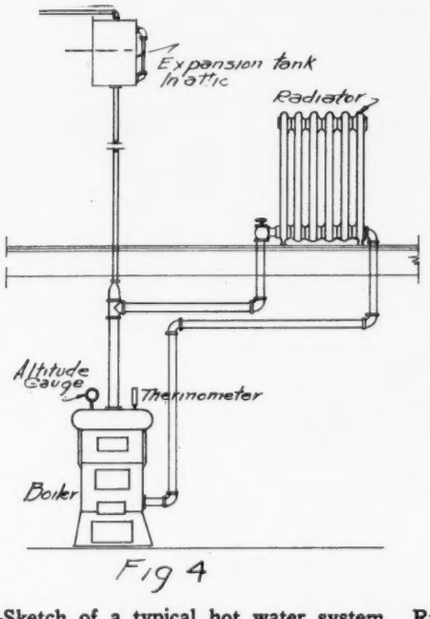

Fig 4

Fig. 4—Sketch of a typical hot water system. Radiators are large, there must be one pipe to and another from the radiator. The water circulates on the same principle as warm air heating—difference in weights due to difference in temperature.

the radiators and piping fill with steam and the pressure will drop below atmospheric due to condensation when the steam output of the boiler decreases. Hence the boiler continues to generate steam after the temperature has dropped below 212 degrees.

While the system is functioning in this manner, we notice that the plant has the characteristics of a vacuum job. Radiators are sized somewhat larger for this type of plant as in cold weather with the boiler generating steam at below 212 degrees, a square foot of radiation will give off less than 240 Btu. per square foot.

These systems operate at a pressure of not more than three or four ounces above atmospheric pressure rather than pressures of several pounds.

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Our third system, Fig. 4, is hot water and is possibly the commonest type that the contractor will experience. With the hot water system, hot water flows through the pipes and radiators in place of steam. The circulation is produced by the difference in the

(*Continued on page* 58)

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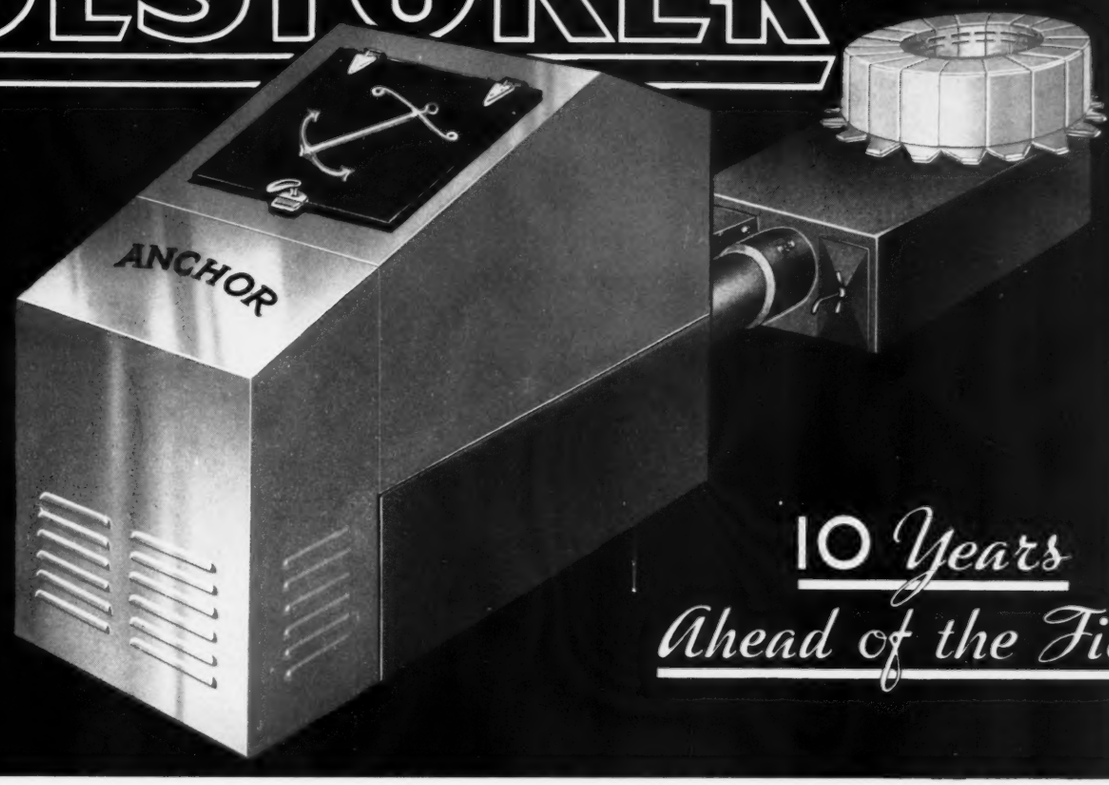

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The facilities of this enormous plant are all behind the production of the Anchor KOLSTOKER. Into this newest addition to the Anchor family has gone all the manufacturing and engineering experience of 69 years. It is manufactured under the most modern line production methods, which make possible a truly superior automatic heating equipment at a minimum selling price. In the Anchor KOLSTOKER, the Anchor name stands, as it always has stood for quality merchandise and satisfying service.

10 Years Ahead of the Field

The superiority of the Anchor KOLSTOKER in design and efficiency is well-expressed in the statement that it is 10 years ahead of the field. It is engineered to satisfy and to sell. Priced for the volume market, its first cost is low; burning low-priced coal efficiently, it costs little to operate. It is designed for homes, churches, green-houses, hotels, apartments, schools, laundries, dry-cleaning plants, factories, store-buildings, etc. Nine stock sizes and larger models built to order. Can be easily installed in any furnace or heating plant now in service. It's the big opportunity in the heating field for distributor, dealer or salesman. The big selling months are just ahead.

SEND the COUPON TODAY

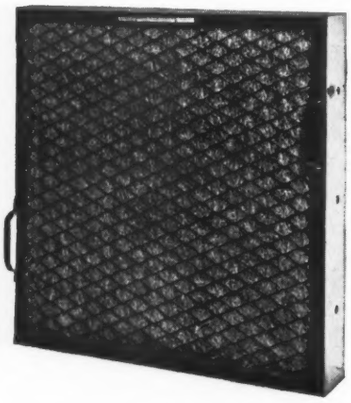
AA-7

ANCHOR STOVE AND RANGE CO., INC.,
New Albany, Indiana.
Please send full information about your proposition on the Anchor KOLSTOKER, from the standpoint of
☐ distributor; ☐ dealer; or ☐ salesman.
Name .....
Company Connection,
if any .....
Address .....
City ..... State .....

ANCHOR STOVE and RANGE CO. INC. ESTABLISHED 1865 NEW ALBANY, INDIANA

The NEW RENU PROGRESSO-PAK FILTER PAD

This improved RENU PAD *---progressively packed--- with its recently developed liquescent viscous coating, introduces a new high standard of performance for renewable type air filters.*



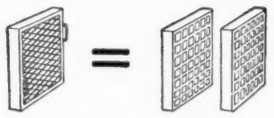
The RENU VENT FILTER *shown above---in addition to its superior performance when equipped with the new* PROGRESSO-PAK FILTER PAD*---is of sturdy all metal construction, yet costs no more than other types. Easy to install because no supporting frame is required. Lower maintenance, since only the pad is renewed.*

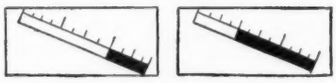
● **A new high standard of performance for renewable type air filters has been attained by incorporating two notable improvements in the new RENU PROGRESSO-PAK FILTER PADS.**

First, they are progressively packed---with fine split wire backing up a coarse medium; and second, they are charged with a newly developed liquescent adhesive which, due to its peculiar consistency, maintains a heavy viscous film on the exposed surfaces of the split wire.

Thus, both the dust-catching and the dust-holding properties of the new RENU PROGRESSO-PAK FILTER PAD have been greatly increased over that of any other renewable type filter on the market today.

When compared with two Throway or similar "cardboard" type filters in series, a single RENU VENT FILTER with PROGRESSO-PAK FILTER PAD has—

1. EFFICIENCY*  **equal or higher.**

2. RESISTANCE*  **30% less.**

3. DUST-HOLDING CAPACITY* **20% more.**

* *Tested in accordance with Standard Air Filter Test Code of American Society of Heating & Ventilating Engineers.*

AMERICAN AIR FILTER COMPANY, *Inc.*
113 Central Ave. IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q. **Louisville, Ky.**

NRA MEMBER U.S. WE DO OUR PART

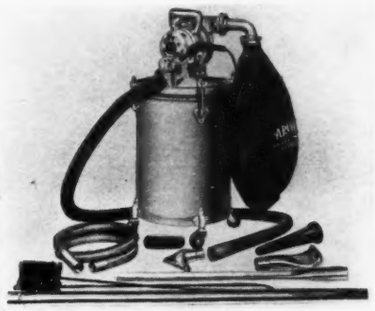
AMERICAN AIR FILTERS

New PRODUCTS

Portable Cleaner

A "one man portable" boiler furnace cleaner, weighing only 30 pounds so that it can be carried conveniently from job to job, has just been placed on the market by the Arco Vacuum Corporation, a division of the American Radiator & Standard Sanitary Corporation.

Mounted on four castors so that it can be moved easily while in use, the cleaner is sold complete with ten standard attachments for all general work. The unit has a three-fifths horsepower Universal motor, and can be used with 110, 220 or 250 volts.



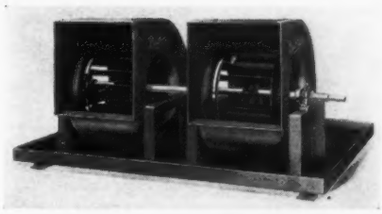
The standard attachments provided with the cleaner are: a standard cleaning nozzle; brush for removing light dust from pipes; 46-inch steel extension handle; rubber nozzle to attach to motor unit for blowing down registers; nozzle with scraper for removing scale from firepot, etc.; large size dust-proof bag; 8 feet of 1½-inch full rubber suction hose; 6-foot flexible metal hose for cleaning furnace radiators; wire flue cleaning brush with five foot flexible handle; and a flat steel cleaning tool.

◆

New Base for Fans

With the increasing use of heating and cooling coils and filters, engineers have required a practical method of combining the various units on a standard inexpensive base.

This need has been met by Buffalo Forge Co., Buffalo, N. Y., with the new "Drip-Pan" mounting for Type "HVA" fans. This drip-pan base is substantial, constructed of sheet metal, heavy enough to be rigid, welded at all seams, and leak-proof. Pan is large enough to catch dripping condensation, and a drain connection is provided.



Clips are provided for attaching a casing around the coil or filter and enclosing the fan inlet. This casing can be made of sheet metal or insulating board.

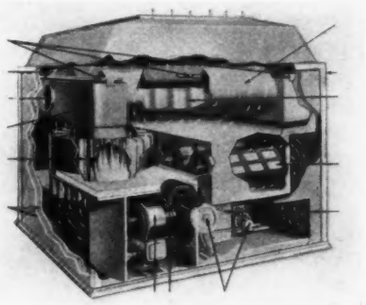
Where extremely quiet operation is desirable the entire unit—pan, fans, coils and casing—can be mounted on floating rubber insulators, which isolate the unit from building foundations.

Buffalo "HVA" Fans with drip-pans are made in eight sizes, all for stock shipment.

◆

Oil Burning Furnace

The Gilbert & Barker Manufacturing Company, Springfield, Mass., recently introduced to the warm air heating industry a new oil fired furnace especially designed for air conditioning installations. The photograph shows a cut-away view of the new unit. As indicated in the photograph, the furnace



consists of a compact oil burning furnace with the burner applied inside the housing; a pressure type blower with large filtering section for cleaning the air and a unique heat transfer radiator which is designed to retard the flow of gases and insure the use of all heat generated by the furnace.

Full specifications of the new unit are contained in literature which the company will be glad to mail to contractors.

Premier Air Washer

The Premier Warm Air Heater Company of Dowagiac, Michigan, announces the development of a new Standard Premier "Slip-Flo" Air Washer, designed for installation with their domestic line of Standard Premier Blowers.

The new washer makes use of twin banks of self-cleaning eliminator plates located immediately below two cleanable type dust filters. Advantages of long life and entire freedom from maintenance expense are claimed for this new construction. An access door

is provided for removal of the dust filters for cleaning.

A feature is that it can be installed on top of the blower at any later date should air washing not be desired at the time the blower is installed. No changes to the blower and only minimum changes to the return air ducts are required.

A descriptive leaflet, together with prices and performance data, may be had by addressing the Premier Company at Dowagiac, Michigan.

◆

Rubbish Burners

Two types of rubbish burners are being marketed by the Universal Frame Co., 5039 Irving Park Boulevard, Chicago, Illinois.

The lowest priced unit consists of a rectangular box with hinged lid and grate raised above the ground with necessary perforations for draft. The more elaborate item consists of a rectangular housing mounted in a pan and having a pyramid flue to assist in controlling the fire and elminating flying ashes. Both items are made of heavy gage steel with grates of heavy perforated plate.

Information on the items is presented in a leaflet which may be obtained from the company.

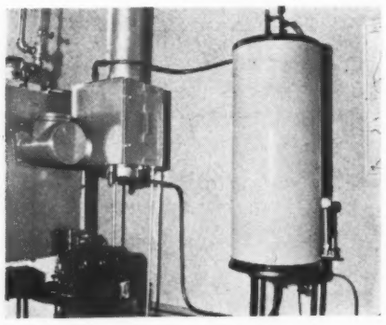
New Products . . . . . .

Water Heater

An improved model of the Marcus smoke stack water heater is announced by Marcus Smoke Stack Water Heaters, Union City, New Jersey.

Some changes in the original heater have been made to increase the general efficiency and to improve the appearance of the unit.

The heater consists of a small cabinet with suitable connections for the smoke stack from the furnace and the smoke pipe to the chimney. Hot gases of combustion enter the cabinet



which contains the copper heating coil through which water from the city supply is circulated.

The company states that the heater makes possible the supplying of hot water without the need for connecting piping or water coils through the front of the furnace. As shown in the photograph, the unit and all necessary piping can be installed on the smoke stack side of the casing.

Full details of the construction, prices and dealer proposition may be obtained from the company.

◆

Heat Regulator

A new heat regulator, known as the "Tritrol", has recently been introduced by the Jas. P. Marsh Corp., 2073 Southport Avenue, Chicago, Illinois.

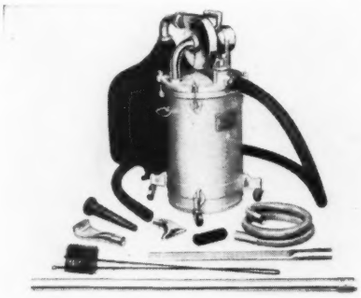
The device is said to be adaptable to the modernization of existing heating systems and is intended to direct the operation of the boiler or furnace draft, oil burner, stoker, gas furnace or it can be applied to various types of valves of either electrical or pneumatic operation.

The unit consists of a temperature recording element located outside of the building and electrically connected to a cabinet control placed inside the furnace. The device adjusts the amount of steam, hot water or air passing through the pipes or ducts into the various rooms, according to the variation in outside temperature.

New Cleaner

The Breuer Electric Mfg. Co., 852 Blackhawk Street, Chicago, announces the development of the new Model 112 Tornado Furnace and Boiler Cleaner, a heavy duty unit of great power.

Specifications include 1 H. P. Ball



Bearing G. E. motor—46¼" waterlift —weight only 45 pounds—observation glass—complete set of 10 standard attachments.

Special feature of this durable new machine is the observation glass which allows operator to see dirt being removed when cleaning in out of the way corners of the boiler or furnace. Tremendous power is also combined with light weight to make for ease of handling and complete cleaning. Motor unit can be removed for use as a handy blower—special tools are also available for cleaning all types of special heating apparatus and accessories.

◆

Damper Sets

Parker-Kalon Corp., 200 Varick St., New York City announce that Hyro UNXLD Damper Quadrants and Dial Damper Regulators are now available in complete sets consisting of everything needed for a damper installation. The sets include a quadrant or regulator with the proper sheet metal screws for attaching it to the duct; a set of bearings and the necessary rivets for fastening the bearings to the damper.

Set No. 38 contains one ⅜" UNXLD damper quadrant, one set of

⅜" damper bearings, necessary screws and rivets.

Set No. 12 contains one ½" UNXLD damper quadrant, one set of ½" damper bearings, necessary screws and rivets.

Set No. 14 contains one ¼" dial damper regulator, one set of ¼" bearings, necessary screws and rivets.

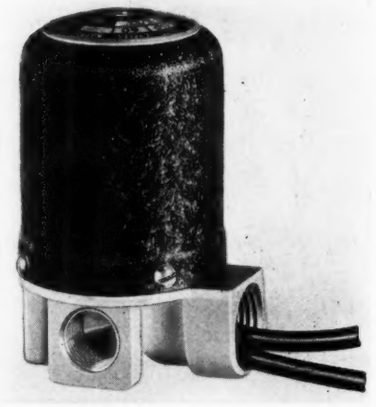
Set No. 38 contains one ⅜" dial damper regulator, one set of ⅜" bearings, necessary screws and rivets.

Prices and other information may be obtained from the company.

Solenoid Valve

A new solenoid valve for the control of refrigerants is announced by Automatic Products Company, Milwaukee, Wisconsin.

In construction, the valve consists of a brass forging and a monel metal valve stem which closes against a special alloy seat. The valve stem is opened and closed by the action of a



movable plunger, which is forced upward by an energized coil.

The plunger and valve stem "float" in the coil and do not touch the top of the guide tube, which is sealed tight so that no leakage can occur. Both the tube and valve stem are non-magnetic.

Full information and prices may be obtained by writing the company.

◆

Rubber in Putty

"Plastikon" putty, a compound similar in appearance and consistency to ordinary painter's putty, but combined with rubber, is a new product being marketed by The B. F. Goodrich Rubber Company, Akron, Ohio.

The manufacturer claims this putty requires no mixing, since it contains practically no oil. It effectively resists corrosive chemicals and fumes and, because of its rubber content, offers very high resistance to moisture.

Plastikon Putty is being marketed in 15 pound, 75 pound, and 225 pound cans as well as in small pint cans.

WHITNEY LEVER PUNCHES

No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅜" to ⅝" by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅝-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to ⅝" by 32nds.

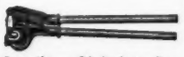
No. 91 PUNCH

Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5-inches. Weight — 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

No. 1 PUNCH



Length — 34 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes from ⅜ to ⅝ by 64ths.

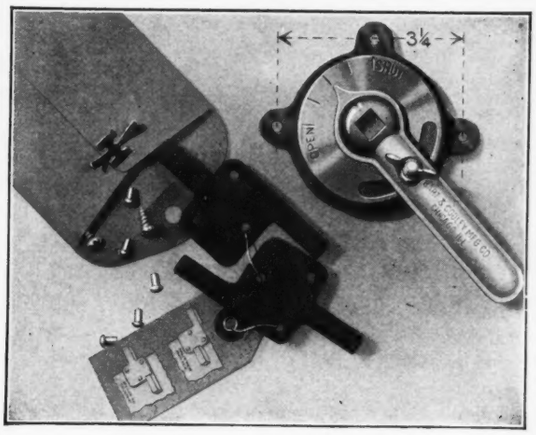
No. 2 PUNCH

Length — 23 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.



H & C DAMPER REGULATOR SETS

Most Convenient—Economical

Set shown is a ⅜" size—No. 70-⅜. Regulator, screws, rivets and a pair of combination (regular and splitter) bearings are all contained in one envelope—positive assurance that all parts will be at hand when needed. Regulator has inner disc which moves with handle closing the slot and preventing air leakage. Cadmium finish, sturdy, attractively priced. ¼" size, Set No. 70-¼, is similar, except that regulator has two instead of three lugs. Regulators and bearings also furnished separately. Carried in stock by leading jobbers.

HART & COOLEY MANUFACTURING CO.
61 W. KINZIE ST., CHICAGO

BUT EVEN MORE:
ways to sell them

Why do thousands of smart contractors stick to ARMCO IRON and Steel Sheets, job after job? If you are one of these men, you know the answers. After twenty years of national advertising backed by satisfactory service, "Armco" is accepted by your customers. • ARMCO sheets are easier to sell, and easier to work in the shop. They cut time-and-labor costs and help you retain that most profitable business asset of all—customer good-will. • But this is only half the story. The rest is in the proved selling aids that ARMCO Distributor Salesmen *offer free* to contractors who use Armco Sheets—direct mail pieces, a simple cost accounting system, work manuals, a subscription to *Ingot Iron Shop News,* and many others. Contractors everywhere are cashing in on all these valuable aids. • You can, too. See an Armco Distributor salesman soon—or write us direct. Take this important step toward more business—bigger profits.

THE AMERICAN ROLLING MILL COMPANY
Executive Offices: Middletown, Ohio

ARMCO

THE SHOP-SAVING IRON THAT SELLS EASIER

New Products

Exhaust Fan

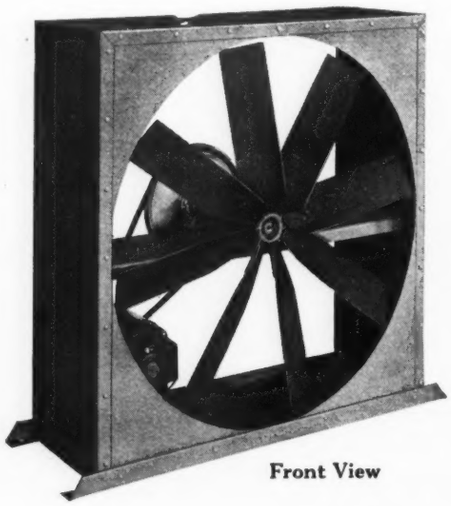
A new exhaust fan, designed especially for summer cooling of residences by means of fan exhaust of attic and upper floor rooms, is announced by the Autovent Fan & Blower Co., 1805 North Kostner Ave., Chicago.

The fan unit consists of a metal plate, propeller fan driven by a motor and belt and housed in a rectangular box designed for installation in an outside wall. This housing is also arranged to take connecting duct work to rooms if a closed system is desirable.

The fans are being made in four sizes ranging from 2200 to 9000 C. F. M. capacity and designed for houses having cubical contents from 6600 to 27000.

The company has also prepared some interesting consumer literature explaining in plain language how the exhaust of attic and upper floor rooms by means of a fan tends to reduce interior temperatures as rapidly as outside air temperatures drop. Cross sectional views of typical installations and full information on the benefits of attic exhaust systems are explained in the leaflets.

Contractors interested in installing attic ventilation systems may obtain copies of the literature and full information on the new fan unit by addressing the Autovent Company.



Front View

Temtrol Display Set

A new display demonstrator set, equipped with a Penn Modern Temtrol, Penn Gothic Temtrol, and Penn Timetrol, for use in dealer showrooms as well as for demonstration in the prospect's home, has just been designed by the Penn Electric Switch Co., Des Moines, Iowa, according to an announcement made this month.

The set can be located in any convenient spot in the showroom, and plugged into the nearest 100 volt A. C. outlet. It stands about ten inches high, in the form of modern, three-sided pyramid, with a frosted electric light bulb at the top. The light represents burner operation. When the adjustment lever on the Temtrol is moved to the right or left past the point of room temperature, the light flashes either on or off, just as the heating plant would start or stop.

The Gothic Temtrol and Timetrol are hooked-up to demonstrate Day-Nite Regulation.

An attractive carrying case is provided so that salesmen can carry the set right into the prospect's home and there hook it up to actually operate the heating plant if desired. A special relay is available so that the demonstrator is adaptable to all types of heating systems.

THE J. M. & L. A.
OSBORN CO
DETROIT—CLEVELAND—BUFFALO

The OSBORN COMPANY is distributor of a number of products advertised in this issue of American Artisan. The pages on which the advertisements appear will be found below.

Air Controls, Inc.	See Page	44	Henry Furnace & Foundry Co.	See Page	29
American Brass Co	" "	5	Independent Register & Mfg. Co.	" "	7
American Rolling Mill Co.	" "	49	Lakeside Company	" "	40
American Sheet and Tin Plate Co.	" "	59	National Super Service Co.	" "	60
Auer Register Co.	" "	43	Owens-Illinois Glass Co.	" "	10
Berger Bros. Co.	" "	59	Parker-Kalon Corp.	" "	8
Bishop & Babcock Sales Co.	" "	37	Republic Steel Corp.	" "	2
Canton Steel Ceiling Co.	" "	56	Ruby Chemical Co.	" "	62
Dreis & Krump Mfg. Co.	" "	63	Russell Electric Company	" "	3
Harrington & King Perf. Co.	" "	56	Viking Shear Co.	" "	58
Hart & Cooley Mfg. Co.	" "	49	Whitney Mfg. Co., W. A.	" "	49

MANUFACTURERS
DISTRIBUTORS
"Everything Used in Sheet Metal Work"

EFFICIENCY LINKED TO COPPER

leading in efficiency

DISTRICT SALES OFFICES

BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, ST. LOUIS, NEW YORK, PHILADELPHIA, PITTSBURGH

WAREHOUSES

CHICAGO, CINCINNATI, NEW YORK, CLEVELAND, ST. LOUIS, PHILADELPHIA, PITTSBURGH

MILLS AND EXECUTIVE OFFICE
PITTSBURGH

HUSSEY

First-cost "worship" has proved costly on many an installation —costly to customer and costly to the installer's good reputation.

Final cost per year of service shows Copper to be the low cost material — ECONOMICAL in dollars and cents.

Copper installations rightly carry better profit for the contractor—ample reason for some extra sales effort in behalf of this more economical material.

Backed by Hussey Copper Service the progressive contractor is ready to "go to town". Pay? Of course it pays, as hundreds of sheet metal men have proved. Today's most active demand is for *better class* work — *quality* is coming back.

Hussey Service — Copper in sheets and manufactured products—prompt execution of orders — convenient main plant and branch warehouses.

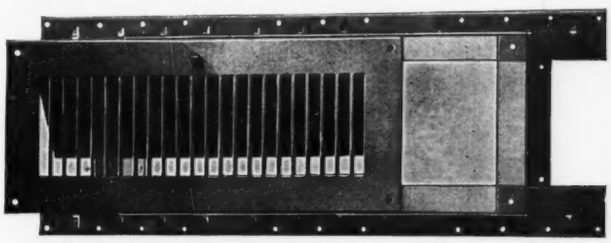
A trial order will tell you more than a bookful; well, why not?

C.G. HUSSEY & COMPANY
PITTSBURGH, PENNSYLVANIA

New Products . . . . . .

Forced Air Registers

A new line of forced air registers, built of perforated steel in vertical oblong and vertical bar design, with ¾-inch square mesh having ¼-inch bridges and ⅞-inch mesh having ⅛-inch bridges, in styles for flush type



above the baseboard, both one and two piece construction, is announced by the United States Register Co., Battle Creek, Michigan.

The company announces that the new units round out the line of registers and make available one- and two-piece construction units for sidewall and baseboard, flange over frame and also flat forced air ventilation faces.

A new operating device, consisting of a double action and a double friction clutch movement permits the opening of the louvre to more than a 90-degree angle with the face. After once being adjusted the device does not have to be reset.

A new catalog describing these additional items has been prepared and will be mailed to any one writing the company.

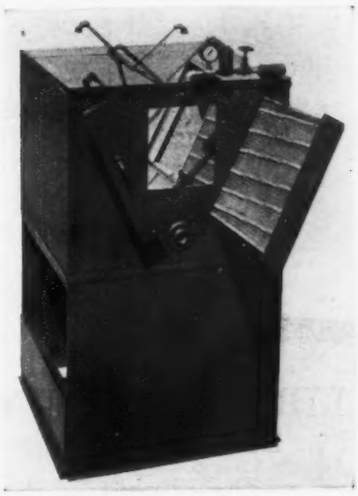
◆

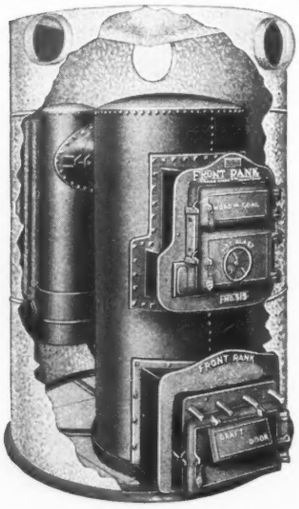
New Blower-Washer

Lau Heating Service, Inc., Dayton, Ohio, manufacturers of air conditioning apparatus, announce a new blower-washer unit which cleans, washes and humidifies.

The unit consists of a single housing containing the blower, filters, sprays and the necessary double and directional plates. The filters are made of a special glass wool and the sprays are directed onto the filter to assist in cleaning. Approximately one-half pint of water per square foot of filter surface is held in the filter by capillary attraction. This water in the filter is picked up by the air to supply humidity.

Full information on the design, operation and characteristics of the new equipment are contained in a leaflet which can be secured by writing the Lau Company.





The FRONT RANK TRADE NAME REGISTERED **Furnace**

Longer fire travel and larger radiating surface are dominant features of this exceptional furnace. Built of copper bearing steel, all joints of the FRONT RANK are riveted, caulked and welded, eliminating any chance of gas leakage. Grate is mounted on roller bearings, shaker lever is waist high, permitting ease of handling.

A Big Opportunity for Dealers!

With the addition of the FRONT RANK line of steel furnaces to our line of MELLOW cast iron furnaces, we now offer you an opportunity to develop a more profitable, a more substantial business. The Liberty Line is now *complete*. There is a heating unit in this line to meet the limitations of practically every pocketbook. Today there is a real live market—right in your own locality—for remodeling, replacements and repairs. Buyers, however, are now more discriminating than ever. Your success in landing this highly profitable business depends on the line of furnaces and repair parts you handle. You can't go wrong on MELLOW and FRONT RANK Furnaces. They will cinch this business for you every time. Our dealer proposition is an attractive one from any point of view. In justice to yourself and your business, get the complete MELLOW and FRONT RANK profit story *today*.

The MELLOW Furnace

Greater efficiency and economy are provided by the built-in smoke consumer. Duplex grates increase combustion. All joints eliminated making it gas and smoke tight. Soot, smoke or dust cannot enter heating compartment. Combustion chamber reinforced at top by lugs affording greater strength and solid support for radiator. Waist high shaking handle makes for easier operation

NRA MEMBER U.S. WE DO OUR PART

LIBERTY FOUNDRY CO.
ST. LOUIS MISSOURI

News Items . . . . . .

Code Cost Assessment Ruling

Regulation designed to clarify the procedure under which members of coded industries will contribute toward the cost of code administration were made public the last week in May by National Recovery Administrator Hugh S. Johnson.

The new regulation, superseding others announced on April 14, reiterates that no contributions may be solicited or demanded by a Code Authority unless the Code either specifically makes non-payment a Code violation or creates a legal obligation and unless both an itemized budget of proposed expenditures and an equitable basis of contribution have been approved by the Administrator.

Nor may Code Authorities, under the latest regulation, institute legal proceedings to compel payment of assessments until NRA has been officially notified by a formal "Certificate of Non-Payment of Contribution" that proper notice of the assessments were given and that the non-contributor was given 30 days in which to pay and did not within 15 days after receiving notice file a protest against the assessment.

Another provision clarified the position of an employer whose operations may be affected by two or more Codes by temporarily exempting such an employer, from any obligation to contribute to the expenses of administration of any Code or Codes other than the one covering his principal line of business pending determination by NRA that he is required to contribute to the Code Authorities for every line in which he may be engaged.

Editor's Note—W. C. Markle, Secretary of the National Association of Sheet Metal Contractors, states that our code has a section specifically stating our code costs can be assessed against all contractors.

◆

Enduro Distributors

Barde Steel Company and Doran Company, both of Seattle, Washington, are newly appointed distributors of ENDURO Stainless Steel.

Gate City Iron Works Co., Omaha, Nebr., and Earle M. Jorgensen Co., Los Angeles, Calif., have also been appointed distributors of ENDURO according to announcement by N. J. Clarke, Vice-president in Charge of Sales, Republic Steel Corporation, Youngstown, Ohio. The addition of these new distributors makes available a total of 41 distributor warehouse stocks of ENDURO Stainless Steel in principal cities throughout the country.

◆

Death of Frank O. Green

Frank O. Green, widely known Des Moines, Iowa, manufacturer and long identified with the warm air furnace manufacturing business, died June 23 at his home in Des Moines. Death was due to heart disease.

Mr. Green was active head of the Green Foundry and Furnace Works for 26 years until 1930. Mr. Green was the son of a pioneer foundryman, who came to Des Moines in 1857 from New York and opened the first practical foundry in the city in 1869.

The early business was a partnership with the father and the two sons, Frank O. and James B. In 1904 the father retired and the business was divided with Frank O. heading the foundry and furnace business and James B. heading the stove repair business.

Mr. Green was an ardent devotee of music and painting; was a garden enthusiast with unusual local ability and was also an ambitious fisherman.

News Items . . . . . .

Fox Air Conditioning Engineering School

On June 5th to 7th, The Fox Furnace Company of Elyria, Ohio, division of American Radiator & Standard Sanitary Corporation, conducted what is believed to be the first Air Conditioning engineering school for heating supply jobbers. Classes were held in the ballroom of the St. Clair Hotel, Chicago, Ill. The registration totalled approximately 115, which included a small number of heating contractors.

At this school there was introduced the new Sunbeam Engineering Manual which simplifies heat loss calculations for any type of building construction and for the rates of

temperature difference from 10° above zero to 30° below zero. Those in attendance calculated the heating requirements; computed the necessary duct, riser and register sizes; and located the Air Conditioner, ducts, risers and registers. In other words every "student" designed an Air Conditioning installation for a residence from the building plans which were furnished for this purpose, before the school was finished.

According to The Fox Furnace Company this school is convincing evidence of the deep-seated interest which the heating supply jobber is according to Air Conditioning. No entertainment was provided during the school. The jobbers paid their own transportation and hotel expenses. Evening sessions were held on all but the final day of the school.

◆

Warm Air Furnace Code Authority Budget Approved

A budget of $27,507.33 for the thirteen months beginning with December 1, 1933, for the support of the Code Authority for the warm air furnace manufacturing industry, was approved June 30, 1934, by Acting Division Administrator Barton W. Murray. Contributions are to be made by members of the industry on the basis of furnace sales for 1933, at the rate of two-fifths of 1 per cent.

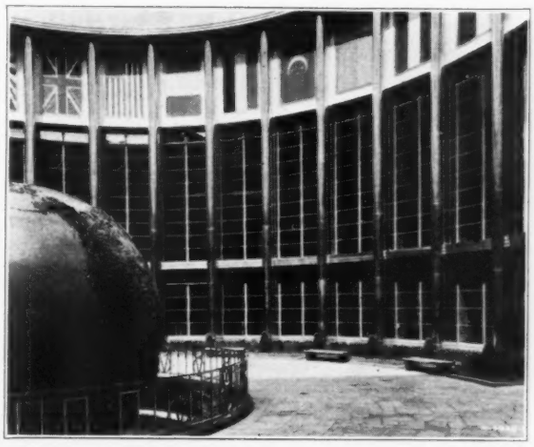
◆

William F. Strate Dies

William F. Strate, long active in the sheet metal business and West Side councilman in Lafayette, Indiana, was killed recently in a collision between an automobile and truck near Indianapolis.

Mr. Strate, head of the James M. Strate & Son Sheet Metal Company, had been a resident of Lafayette for 37 years. He was very active in local politics and also active in the local and state sheet metal association, having served as president of the Lafayette association.

A famous Architect *has discovered* APOLLO ChromCopper

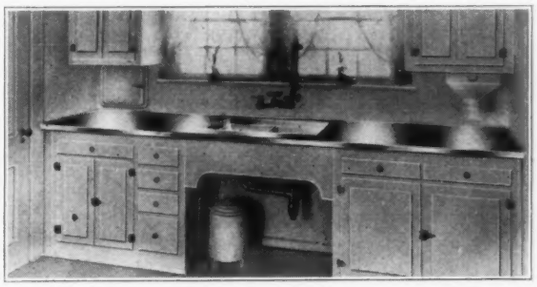


ALBERT KAHN, Detroit, Architect

FORD EXPOSITION BUILDING CHICAGO WORLD'S FAIR, 1934

Uses more than 20,000 square feet of *APOLLO* ChromCopper to symbolize the triumph of science over the destructive forces of nature.

Visit this beautiful structure this summer and see for yourself how well *APOLLO* ChromCopper Satin Finish appears on the balcony, the front entrance, the Court of Nations (above pictured) and the Grand Concourse. Specified by one of the country's leading architects, *APOLLO* ChromCopper is a metal that you can recommend to your trade as a covering for tables, meat warmers, shelves, drain boards and range hoods. It will serve you and your trade as faithfully as it serves America's leading industrialist.



APOLLO ChromCopper is the correct and profitable metal to use on work tables.

Write for a copy of our leaflet that illustrates *APOLLO* Chrom Copper in service on the Ford Building. Ask your jobber for a sample of *APOLLO* ChromCopper "the same as used in the Ford Building". Always demand the original and genuine *APOLLO* Sheet when ordering.

APOLLO COMPANY

BOX AA LA SALLE, ILL.

See page 18, Annual Directory Number, for full particulars regarding all APOLLO Pre-Finished Metals.

You can depend on

GLOBE TRADE MARK BRAND

for all sheet metal needs

ROOF, downspout, cornice, flashing—whatever you need in sheet metal building products....*ready* when you want them!

Not only does Globe excell in quality, but also in ability to make delivery of what you want, when you want it. And in these days that is a vital consideration in placing your sheet metal business.

You make no mistake when you use Globe products—they are the finest you can buy, designed and formed to fit accurately, and to last for years. Furthermore, they're economical to use, and they make satisfied customers. Make Globe your headquarters for every sheet metal need.

The Globe Iron Roofing & Corrugating Co.
Cincinnati, Ohio

GLOBE
SHEET METAL
BUILDING PRODUCTS

225

News Items . . . . . .

Contractor Wants Literature

George M. Schwartzmeier, 269 Otis Street, Rochester, New York, operating under the firm name Sheet Metal Service Company, would like to have manufacturers send him catalogs, leaflets, price lists, etc.

◆

Furnace Code Authority Compliance

Acting Division Administrator Barton W. Murray, on June 18, approved an order authorizing the code authority for the warm air furnace manufacturing industry to handle trade practice complaints arising under the approved code.

Complaints made by one member against another member for failure to comply with the code's labor provisions shall be classed as trade practice complaints, the announcement states.

◆

Rudy Holds Dealer Clinic

Seventy-three heating and air conditioning dealers of the Rudy Furnace Co. recently completed the largest engineering and sales clinic ever held at the Rudy plant.

Called primarily for its Indiana representatives, the clinic attracted dealers from Illinois, Michigan, Ohio and Kentucky as well. It was the second clinic of the year for the company, the first having been held in Appleton, Wis., for representatives in that area.

Under the direction of Thomas Torr, member of the American Society of Heating & Ventilating Engineers, and

the Company's chief engineer, the meeting discussed and received training in the theory of heat, the figuring of both gravity and forced air jobs, in the use of a new forced air installation system developed by the company and in the practical scope of "attic exhaust cooling." Under the direction of the company's sales and advertising department, the meeting covered such points as retailing heating and air conditioning, humidity, automatic controls, and the use of new sales methods.

◆

National Association Convention

The National Wholesale Hardware Association, 505 Arch Street, Philadelphia, announce that their 40th annual convention will be held at Atlantic City, New Jersey, October 22 to 25, in conjunction with the convention of the American Hardware Manufacturers' Association. Convention headquarters will be at the Marlborough-Blenheim Hotel.

Additional information on the convention may be obtained from George A. Fernley, Secretary-Treasurer.

National Warm Air Meeting

(*Continued from page* 21)

ciency is not a sound indication of the real loss in the system. The over-all efficiency may be as high as 90 per cent indicating that heat loss from the casing and from the duct is not truly 'lost' but remains within the structure and serves to warm floors, ceilings, walls, etc.

"The real object of the warm air heating industry should be to make people comfortable 365 days in the year." Professor Willard said that it is impossible to lay too much emphasis on this statement.

True Comfort

"True comfort," declared Professor Willard, "eliminates the long held idea that 72 degrees at the breathing line is a satisfactory comfort condition. Room temperature gradients are very important and these gradients become increasingly important as the weather gets colder. We have not nearly arrived at the means of putting air in and taking air out of rooms in a manner which insures a satisfactory comfort condition throughout the structure. Much remains to be learned on distribution and return air handling. Tests would seem to indicate that a large volume of air at low temperatures helps to overcome stratification, cold 70, cold glass and wall areas.

"American home owners need better houses. We must advocate the use of awnings, insulation and other construction features or adjuncts which reduce the heating and cooling load and bring satisfaction to the owner."

Professor Willard made the interesting assertion that variable inside temperatures—increased temperatures in cold weather and decreased temperatures in mild weather—is something the industry should be considering.

Professor Willard pointed out that we have today very few "tight" houses and that unless such houses are built it will be impossible to our industry to maintain the percentage of relative humidity which we have been advocating and which the home owner needs. He pointed out that this condition is aggravated on cold windy days; in other words, just the type of outside weather and condition when interior satisfaction is most needed.

Insulation

A preliminary report on the subject of insulation in homes was covered by Professor A. P. Kratz. Professor Kratz used lantern slides to illustrate the reaction of insulation in walls as compared to the reaction of insulation as an individual material. Professor Kratz made the point that the coefficient of heat transfer of an insulating material is no true indication of the reduced coefficient of heat transfer of the wall as a whole.

S. Konzo, Special Research Associate, reported the test data in-

EXTRA EFFICIENCY for GRAVITY INSTALLATIONS

Dealers report remarkable efficiencies with the U. S. Steel Furnace in gravity installations where fans have been considered necessary with other furnaces.

The design of the U. S. gives "pressure job action" in gravity installations because the base is comparatively cool while the upper half is very hot. Incoming air is speeded up 50% in the casing because there is no superheated base to baffle this movement upward. As a result, houses difficult to heat with gravity are easy for the U. S.

The illustration shows how the U. S. radiator can be rotated to point directly to the chimney —saving pipe and elbows. These are only a few of the mechanical advantages that are making profits for U. S. Furnace Dealers.

Write for Complete Data

U. S. PRESSED STEEL PRODUCTS CO.
KALAMAZOO, MICHIGAN

vestigated in the Research Residence in warm air heating since the last December meeting. The report covered the following items:

1. Fuel savings effected by storm sash in the Research Residence.
2. Room temperature gradients.
   a. Effect of storm sash.
   b. Effect of thermostat location in a coal-fired, forced-air heating system.
3. Comparative studies of register types and register locations.
   a. Effect of inlet air velocities in return air registers.
   b. Room temperature gradients obtained with four types of warm-air registers.
   c. Maximum and minimum register air velocities permissible with four types of warm-air registers.
   d. Air circulation in room with four types of registers.
4. Performance of two sizes of furnaces of the same type in the coal-fired, forced air heating system.
   a. Comparative efficiencies.
   b. Comparative fuel consumption.
   c. Limiting factors in the size of furnace that can be used.
5. Performance of two types of spray nozzles in the air washer testing plant in the Mechanical Engineering Laboratory.
   a. Evaporation rates and humidifying efficiency as affected by size of nozzles.
   b. Percentage of total spray water evaporated by nozzles in a non-recirculating domestic air washer.

The subcommittee on a book to be prepared and sold by the association covering gravity heating information developed by the research staff reported that such a book is feasible and can be put out in the form of approximately 190 pages.

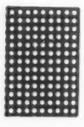
The committee reported that only a preliminary outline of the contents of the book has been prepared as yet. More than 900 copies of the book were signed for by manufacturers present at the meeting.

The final session of the convention included an address by D. M. Dobbins "Why Not Do It Now and How Are We Going to Make a Profit?"; an address by C. C. Whittier, "Heating and Air Conditioning the Modern Home—An Opportunity" and reports of committees on "Credit," "Public Information" and "Membership." Excerpts of the two papers will be published, if possible, in a future issue.

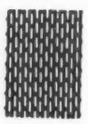
Several interesting events were staged at the meeting. The contractors in the three Chicago associations presented I. W. Rowell with a floral token of appreciation for the cooperation his firm has extended during the last two years. Contrary to usual custom the banquet was omitted and members were permitted to spend their time at the Century of Progress. Advantage was taken of the attendance at the convention to hold several meetings of groups with special problems to be worked out.

PERFORATED METALS

Every Sheet Metal Worker needs perforated metal in one form or another.



Finely perforated brass and tin-plate can be shipped quickly from our stock. In brass these sizes include No. 00 holes (.020" in diameter) to No. 8 holes (.138" in diameter); in tin plate—No. 1 holes (.027" diameter) to No. 8 inclusive.



You may find it convenient to draw upon this stock.

Aluminum, monel metal, copper, or other metals are perforated to order.

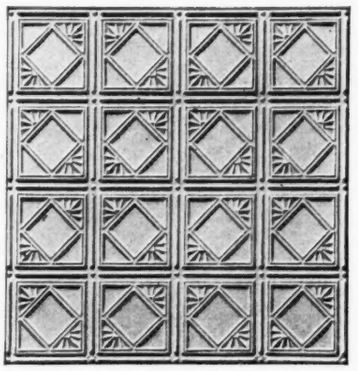
Everything in perforated metal.

For processing food products and to withstand certain chemicals special alloys are offered. Write us if you have such problems.

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

Remodel Ceilings *with* Steel



Here's a new Canton design—ready to help you close profitable ceiling jobs.

Uncle Sam says he'll help folks remodel; good news for sheet metal men.

Those ceiling jobs where steel is the one right material are "naturals" for Canton Steel Ceilings.

On many other ceiling jobs steel has exclusive advantages not always appreciated by owners—until explained by sheet metal men.

Write today for data on designs and specifications, and full information on application. Also list of leading jobbers.

CANTON STEEL CEILING CO.

CANTON . . . . . OHIO

Warehouse Service: 497 West Street, New York, New York

News Items . . . . . .

Furnace Pipe and Fitting Code Approved

Announcement is made by the National Recovery Administration that the code of fair competition for the warm air furnace pipe and pipe fitting manufacturing industry, supplementary to the approved code for the fabricated metal products manufacturing and metal finishing and metal coating industry has been approved and became effective Monday, May 28.

One clause in the code, that providing for a waiting period between the filing and effective date of price lists, has been stayed by order of General Johnson.

A code authority to consist of six members, two to represent the members of the Furnace Pipe Institute, two for the Eastern Pipe and Elbow Manufacturers Association and two to represent those members of the industry not members of either of these two organizations, is provided for.

A uniform cost accounting system is to be developed by the code authority and thereafter no member of the industry shall sell below his individual cost except to meet competition. In the event of an emergency due to destructive price cutting, the code authority, with the approval of the administrator, may arrive at a reasonable cost for the industry to remain in force for the period of the emergency.

◆

Republic Steel Advances Hamaker

L. S. Hamaker, Sales Promotion Manager of Republic Steel Corporation, Youngstown, Ohio, has been advanced to the position of Vice-President and General Manager of The Berger Manufacturing Company, Canton, Ohio, wholly owned subsidiary of Republic, it is announced by B. F. Fairless, First Vice-President of Republic. The appointment was effective June 1.

Mr. Hamaker began his career in the steel industry in the sales department of The Berger Manufacturing Co. and later was made Advertising Manager. During a series of mergers he became Advertising Manager of United Alloy Steel Corp., Central Alloy Steel Corp., and finally of Republic Steel Corp., when that organization was formed. He was appointed Sales Promotion Manager of Republic in 1931.

◆

Swartwout Appoints Sales Manager

A change in the personnel of the Ventilation Division of The Swartwout Company of Cleveland, Ohio, has placed B. K. Paget, formerly of Scranton, Pa., in charge of Ventilator Sales, with headquarters at Cleveland.

Mr. Paget was formerly connected with John J. Nesbitt, Inc., and the L. J. Wing Mfg. Co. of New York in Heating and Ventilating Sales work and brings to the Swartwout Co., considerable experience in the field. He has also specialized in advertising and marketing with the McGraw-Hill Publishing Co. and other connections.

During the World War he was with the Royal Flying Corps and the Royal Field Artillery of the British Army and since the war has been for some time associated with the Pennsylvania National Guard, thus having the peculiar distinction of being commissioned in both the British and the American Army.

You Will Secure More Business
by selling
ROUND OAK FURNACES
Known from Coast to Coast—

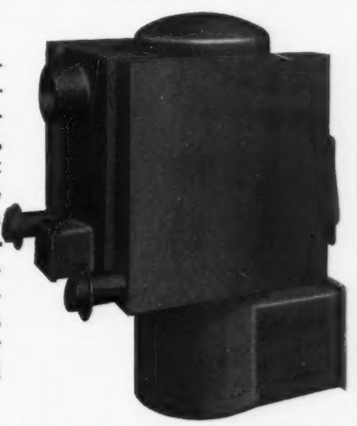
MOISTAIR BLENDED-IRON

Today's outstanding furnace value. The only furnace with the patented one-piece diamond shaped radiator. Also, there are many other superior features which make it the standard of comparison.

NOTE—For contractors and Builders who want a lower priced furnace, we offer the Thrift Cast Furnace supplied in three sizes.

IT IS TIME TO GO AFTER YOUR FURNACE PROSPECTS NOW

OIL MASTER



New and different in design—built of copper-alloy, arc-welded, gas and dust tight, the OIL MASTER is a most efficient, dependable and economical oil burning furnace. It is adapted for any good type oil burner.

Remember we offer a complete line of COAL—OIL—GAS FURNACES.

Wire or Write for Complete Information

ROUND OAK FURNACE COMPANY
Dowagiac - - Michigan

Distributors
Sioux Falls Corrugating Company, Sioux Falls, So. Dak.
Haw Hardware Company, Ottumwa, Iowa
Waterloo Metal and Manufacturing Co., Waterloo, Iowa
McIntyre Company, Fond du Lac, Wisconsin

Ventilating a Doctors Offices

(*Continued from page* 17)

what more awkward to install on this particular job.

The small propeller type fan was mounted in a box 12 inches square which was reduced to a neat 8 by 8-inch duct running along the ceiling. In order to conserve heat, stacks were run to the floor in both rooms and the opening into the top of the stacks was equipped with dampers having louvred registers.

The opening at the floor could either be equipped with registers as a matter of appearance, although from a utility standpoint, running the ducts down to within 3 inches of the floor and leaving them open all around was thought just as well. The fan housing was equipped with weather proof louvres to the outside.

The requirement for these rooms is 300 cubic feet of air per minute. This will furnish ventilation for 10 people. There are not likely to be that many people in these rooms at any one time, but the air before it gets to them has to pass through the other rooms, so the basis of the ventilation requirement for the total number of people likely to be in all of the rooms including the reception room and the doctor's office as well as the waiting room is used.

Cost and Profit

The sheet metal contractor's estimate for the duct work was $40.50 and his price on the fan including a nominal profit is $24.00, making a total of $64.50. This estimate did not include any special wiring nor any painting or finishing of any kind. The fan came completely assembled with the stand and approximately 8 feet of cord. All of the wiring and plugging and also the painting was left to the building manager.

Platte Overton

(*Continued from page* 44)

weight of the water in the supply and return due to the difference in water temperature. This is exactly what takes place in gravity warm air heating except that the air is not confined in radiators.

The velocity of water flow depends on the temperature difference between the supply and return. Our heat is given off by the cooling of the water in the radiator, and as it is water in place of air or steam, the Btu. output is in direct ratio to the pounds of water passed through the radiator and the temperature drop per pound of water. We may say that the average hot water radiator on a well designed job will give off 140 Btu. per square foot per hour.

The next article will take up the formulas and calculations necessary to select and apply the apparatus used in boiler-air conditioning systems.

VIKING

CLOSER ESTIMATES .. SAFER PROFITS

On estimated jobs the mistakes come out of profit. Profits, on *any* job, come last — after everything else is paid — including shearing costs.

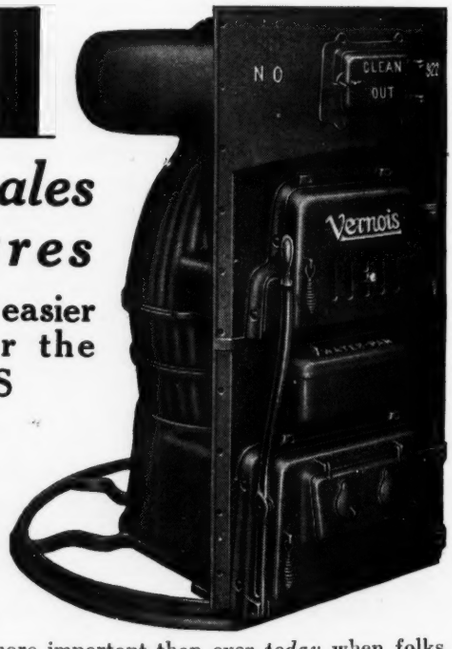
Why not give your profits a break?—at least to the extent of having Viking Shears give you clean, fast, dependable service.

Minimum time and labor cost every time you use trusty VIKING SHEARS.

VIKING SHEAR CO.
ERIE . . . . PA.

11 *real sales features*

more and easier sales for the VERNOIS dealer—



For replacement jobs as well as new construction, the Vernois Line gives extra margin of satisfaction—more important than ever *today* when folks are looking for up-to-date products built with old-fashioned quality.

Write for literature outlining the Vernois features—also dealer proposition.

MT. VERNON FURNACE & MFG. CO.
MT. VERNON . . . . . ILLINOIS

Missouri Meeting (*Continued from page 22*)

power, but there must be something in the business that you can build on."

Air Conditioning

The first address of the second day's session was given by A. G. Brower who began by saying that sheet metal men had come to a stopping place. Several years ago the water men were taking away business from warm air heating because of superior installation. Today the water men are copying warm air and calling it air conditioning.

He further stated that by looking in the trade magazines one could see who was pushing air conditioning. He said, "you men should realize that air conditioning is your job if you want it." The next question is how to go about it. That is not hard.

"The condition of your shop is going to reflect favorably or unfavorably on the customer to whom you are trying to sell. Keep your place looking neat and modern. Co-operation with your organizations is very important. You have to keep up with latest information. When you are helping the other person in your organization you are only helping yourself. Get together and help each other to hold that which the other men realize is a coming thing."

Filters

This was followed by an address by Frank Myers, Owens-Illinois Glass Co., on filtering.

Mr. Myers started by saying that many no doubt think that air filters are just another evil, something more to add to the furnace, something more that has to be sold. Air filters are not nearly so simple as they seem. The design is difficult to understand, and prices must be such that the public can afford to own it.

Recently there has come about the greatest opportunity for merchandising such equipment. They can be installed in the old gravity furnaces. They provide comfort in hot weather as well as cold, and keep the air clean, which makes the furnace a thing to be desired as well as a necessity.

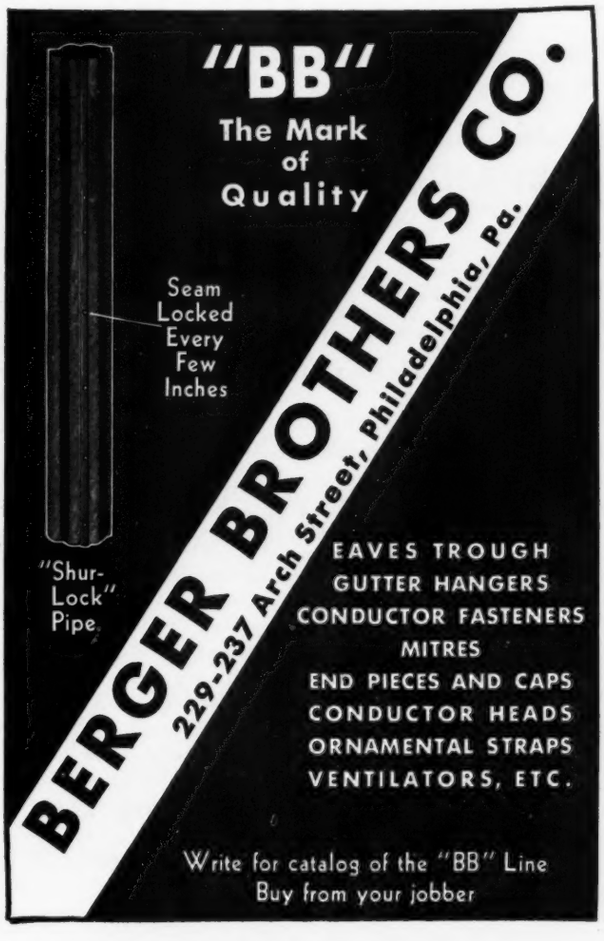
He pointed out the value of selling to the housewife who looks after the comfort of the house, and is the real buyer. The price has been fixed so that those in moderate circumstances can afford to have air filtering installed.

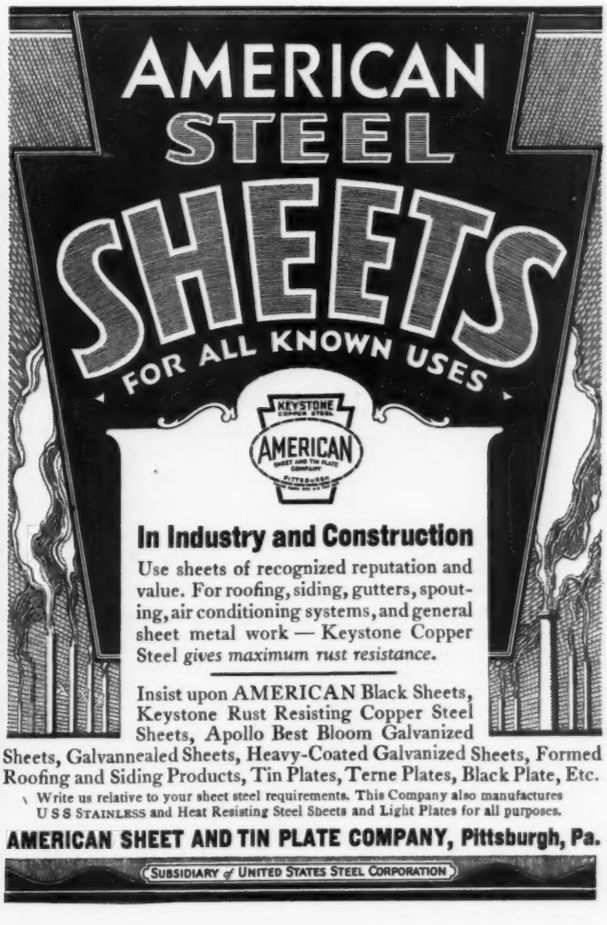
Fair Competition

F. A. Kalish spoke on Fair Competition and Better Selling.

Mr. Kalish said that fair competition is not the difficult problem under a code that it is when we are working without any rules. He emphasized the importance of talking about your own product when you are selling, and of not debunking your competitors' products.

"Every man in your business organization can help to sell, whether




AMERICAN STEEL SHEETS
FOR ALL KNOWN USES
KEYSTONE COPPER STEEL
AMERICAN
In Industry and Construction
Use sheets of recognized reputation and value. For roofing, siding, gutters, spouting, air conditioning systems, and general sheet metal work — Keystone Copper Steel gives maximum rust resistance.
Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvannealed Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.
Write us relative to your sheet steel requirements. This Company also manufactures U S S STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.
AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.
SUBSIDIARY of UNITED STATES STEEL CORPORATION

he sells something tangible or intangible, a furnace or an appreciation of comfort," declared the speaker.

There followed a reading of the motions by Secretary Steinmetz. The first, by Andrew Zahner, read as follows: "I move that this organization communicate with the national code authorities requesting that the East half of the State of Missouri, now part of District No. 8 under Mr. Wendt, be added to District No. 9 of Mr. Miller to enable our State Association to function independently in administering our code of fair competition, in the state of Missouri."

Considerable discussion about the boundary line of districts 8 and 9 followed. The motion was then seconded and carried.

Code Committees

The second motion by Wm. Seaman, read as follows: "I move that two State Code Authorities be elected to assist in organizing the various Local Code Authorities in this State, also to assist in settling any controversy arising over intrastate business in our industry, one of these to be selected from the Eastern Section and one from the Western Section of the State."

Mr. Tierman of St. Louis said that the group was not representative enough of the State to decide this question.

Mr. Seaman said that the code tended to scare the Kansas City members away from meetings, and Mr. Tierman said that the opposite effect was produced in St. Louis, that from 30 to 40 members their ranks had increased to 120.

President Artmaier read the following telegram from W. C. Markle to clarify the situation: "State Code Authority can be elected at St. Louis convention. Be sure to invite all known contractors in state to participate in election and make sure each subdivision under our code is represented by members elected."

W. A. Wendt, Chicago, committeeman from the 8th zone, arrived and made the following remarks: "There have been no really definite instructions given out at this time by the NRA, but there is a bulletin sent out by the code committee, Mr. Markle, Mr. Hayes, and Mr. Griffin. Owing to the fact that the code authorities have not been approved, the whole subject is left open, and about all any of us can do at this time is to use ordinary good common sense.

"Elect your men, keep records of the election, present records to me and I will in turn forward it on for approval of the department. All action taken must be approved by the department. Minutes must be kept and turned in. Absolutely no reason why you gentlemen can't go on and make your choice either state, regional, or local, as long as the industry is truly represented, whether it be open shop, closed shop, organized, or unorganized. All are supposed to have a free hand and voice in all procedures.

"There is no actual geographical division at this time of districts, merely pencil markings, and they will probably be changed."

Your Best Salesman

Try This Cleaner Free

You Keep All It Earns

THE quickest proof that you sure will make good money with a furnace cleaner right now is to accept this free trial offer. Prove that the Super is the real machine you want and that Super cleaning will sell your furnaces and repairs. A Super, complete with all new tools for furnaces, for chimneys too, will reach you for free trial—no obligation if you decide against it. Use it three days after arrival—work it hard—our risk of accident—you bill the jobs—you keep all earnings, all yours. If you do not like the Super, return it. No argument. Scores of heating men every spring try Supers that way, and make good money year after year. You can, too, when you say so.

For other details, clip this address, paste on your printed envelope and mail.

THE NATIONAL SUPER SERVICE COMPANY

1944 N. 13th St., Toledo, Ohio

MAKE YOUR OWN SPRINGTIME WEATHER!

is just off the Press. It tells you all about America's foremost Air Conditioners.

Let us send you your copy. You'll want to sell them on your next job once you read about them.

See them at the World's Fair, General Exhibits Building.

The Peerless Foundry Co.

Indianapolis, Ind., U. S. A.

News Items . . . . . .

Dealers Attend Engineering School

The photograph shows a group of dealers and their engineers who attended the sales and engineering school conducted by the Dail Steel Products Company, Lansing, Mich., May 21, 22 and 23. Sales methods and up-to-date engineering instruction was given by members of the Dail staff and outside authorities. The men are:

The rear row, standing, reading from left to right, A. W. Wittman, of the I. A. Thiele Company, Evansville, Indiana, J. P. Eddie, Sales Manager, Dail Steel Products Company, R. A. Hattersley, of E. A. Hattersley & Sons, Fort Wayne, Indiana, George A. Wetherall, of the Malvin

and May Company, Chicago, C. C. Cobb, Designing Engineer, of the Dail Steel Products Company, Furnace Department, J. S. Haynsworth, Malvin and May Company, Chicago the second row kneeling, reading left to right, B. F. McLouth, Sales and Heating Engineer, Dail Steel Products Company, Jack Holwerda, of the Holwerda Heating Company, Grand Rapids, Michigan, Ernest I. Dail, President and General Manager of the Dail Steel Products Company, Robert Chamberlain, of the Chas. Sexauer Company, Detroit, Michigan, Earl L. Clevenger, Heating Contractor, Muncie, Indiana, the front row, reading left to right, Fred Bishop, Sales Engineer and Representative of the Dail Steel Products Company, Detroit, Elmer Williams, of the Neenah Hardware Company, Neenah, Wisconsin, Wm. J. Metzger, of the Wm. J. Metzger Company, Kalamazoo, W. R Williams, Sales Representative of the Dail Steel Products Company, Oshkosh, Wisconsin, and last Mr. I. L. Shuemaker, of the I. L. Shuemaker Sheet Metal Works, Cairo, Illinois.

◆

Death of Harry L. McCauley

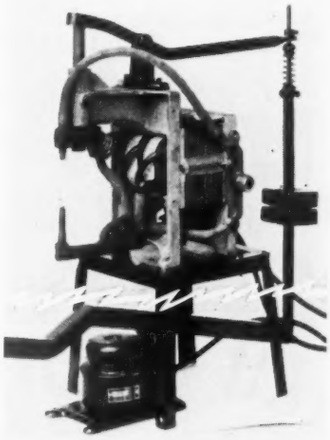
Harry L. McCauley, Milwaukee, Wisconsin, District Sales Manager of the Inland Steel Company, Chicago, died Sunday, June 24th.

Mr. McCauley disappeared from his home in Milwaukee that day, and his body was found in the lake near Milwaukee Tuesday, June 26th. Apparently a suicide, no explanation of the fact has been offered, save that Mr. McCauley had a nervous breakdown during the past several days, and was probably mentally deranged.

After working in the Gary Sheet Mills of the American Sheet & Tin Plate Company, he was employed on May 17, 1920, at the Chicago office of the Inland Steel Company. On May 21st, 1924, he was transferred to the Milwaukee office, as Assistant District Sales Manager. On March 1, 1928, he was promoted to District Sales Manager.

WELDEX SPOT WELDER

Fast—Permanent—Inexpensive



Electrically and Mechanically Guaranteed

110 Volt and 220 Volt A. C.—60 Cycle—Capacity up to two pieces of 16-gage stock—1000 welds per hour.

Priced $25.00 up.

Send for descriptive literature.

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9666 E. Jefferson Detroit, Michigan

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THE *Unpainted Roofs* IN YOUR COMMUNITY

In every community, there are any number of sheet metal roofs which must be painted at regular intervals in order that they adequately protect the buildings they cover. This is profitable business that sheet metal men frequently fail to take advantage of.

The way to most profitably work this business is with Thompson's "370 SPECIAL RED." This paint is outstanding because it has passed every quality test. Pure Red Lead, the best rust preventative known for metal, genuine imported Spanish Sesqui-Oxide of iron, highest grade Raw and Boiled Linseed Oil, just enough drying oils to give the proper set up—all go to make up a paint for sheet metal roofs that never gives cause for come-back or complaint.

Other Thompson Products are Alumbrite, the new Aluminum Paint for Wood and Steel and Lin-o-Jap, the Perfect Reducing Oil for all Paint.

THOMPSON & COMPANY

P. O. Box 557, N. S. PITTSBURGH, PA.

"YOU SOLVED MY PROBLEM"
Says One Mechanic—Referring to
Liquid—Paste—Core Solder

Rubyfluid
SOLDERING FLUX
Thousands have said the same thing about it, but Mr. Mechanic or Mr. Manufacturer we want to prove to you it will solve yours.
Send for free sample.
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Improved
VENTILATORS

FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise—no upkeep.
ÆOLUS DICKINSON
Industrial Division of Paul Dickinson, Inc.
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FOR THE
Satisfactory
FURNACE INSTALLATION
The most satisfactory furnace installations result from the use of Walsh Asbestos Furnace Cement. No longer is it necessary to risk your reputation on furnace cements of questionable merit . . . just use Walsh on every installation and repair job.

●Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250 and 500 lb. steel drums.
●We also make Furnace Tile and Fire Brick.
WALSH REFRACTORIES CORP.
Producers of High Grade Refractories for 50 Years
4430 North First Street St. Louis, Mo.

ALL ON ONE ORDER TO BRAUER
Any REPAIRS FOR STOVES BOILERS and FURNACES
A.G. BRAUER SUPPLY CO. SAINT LOUIS
ALL IN ONE SHIPMENT TO YOU

New Literature . . . . . .

The Unit Sales Plan Leaflet

An interesting leaflet, arranged in the manner of a presentation of modern heating for the home owner is announced by Russell Electric Company, Chicago, Ill. The title of the circular is "The New Day for the Furnace Heated Home."

Section 1 explains the Hold-Heet 4-Unit air conditioning plan covering controlling heat, cleaning and humidity in winter and cooling in summer. The section explains how Russell equipment is designed to accomplish one or more of these four plans of operation.

Section 2 covers unit No. 1 consisting of apparatus for properly controlling the warm air heating plant in the winter time. The apparatus used is illustrated and accompanied by full descriptions of each item and the complete system.

Unit No. 2, covering humidity, explains in non-technical language just how important humidity is and explains how futile are such methods as open pans on registers. Full explanation is given of the Hold-Heet automatic humidifying equipment.

Unit No. 3 covers by text and illustration the results to be anticipated with forced warm air. Much interesting information for the home owner is contained in the explanation of the advantages of forced air.

The last section of the leaflet covers the advantages of cleaning air by filtering and covers ways and means of obtaining summer comfort by circulating air.

This leaflet can be obtained by writing the Russell Company.

◆

Air Conditioning Catalog

Lewis Air Conditioners, Inc., 829 Second Avenue South, Minneapolis, Minnesota, announce a new catalog, "Lewis Air Conditioning," covering the company's complete line of air conditioning apparatus.

The company also announce that a special department has been opened to give engineers and architects complete service on both heating and air conditioning layouts.

The leaflet describes the company's new air conditioning unit, a cabinet type conditioner designed and attractively finished for installation in the room or in the larger sizes designed for central location in the basement.

The apparatus is entirely new and consists of fans, filters, heat transfer sections for both heating and cooling. Cut-away views show the general design of the new apparatus and the text gives full explanation of the various parts of the units and explains just how the apparatus operates. Tables of sizes, capacities, etc., are included for ready reference.

Copies may be obtained from the company.

◆

ConditionAire Unit Leaflet

A new folder describing the Kelsey-Bradley ConditionAire unit has been prepared by Kelsey Heating Company, Syracuse, New York. Copies of the leaflet may be obtained by contractors writing the company.

The folder gives illustrations and explanation of the new apparatus which consists of a newly designed steel furnace for both coal and oil to which is attached a blower-filter section encased in the furnace housing.

This new apparatus is furnished in sizes ranging from 201 to 707 square inches of grate area. The leaflet explains the new application of oil burners to this furnace with drawings and text.

New Literature . . . .

Register and Furnace Accessory Guide

Hart & Cooley Manufacturing Co., Holland, Mich., have ready for mailing to contractors the third edition of their Pocket Guide. This guide shows several new items of general interest to the trade, such as the No. 266 close mesh No Flex cold air face, No. 80 series cabinet register, a new 3-piece sidewall forced air register and the No. 90 directional grille.

In addition to these new items, the guide covers the complete line of floor registers, cold air faces, baseboard, cabinet and sidewall registers, ventilators, forced air registers and returns and in the second section the company's complete line of damper regulators and sets, chain plates pulleys, bearings, damper clips, hooks, etc.

In connection with the first two sections published each page contains an illustration and complete description of an item accompanied by tables of sizes, capacities, finishes, prices, etc.

The guide is made up in small size for carrying in the pocket and will be mailed free of charge to any contractor addressing the company.

◆

Welder's Qualification Booklet

The Linde Air Products Company, New York City, has published a booklet entitled "The Testing and Qualification of Welders" in which the Linde Company has set up a procedure whereby the knowledge and ability of welders may be tested. The booklet shows various types of welds under tests and explains how the seams may be judged to rate the operator.

Copies may be obtained from the company.

◆

Porcelain Enamel Leaflet

The American Rolling Mill Co., Middletown, Ohio, has issued an interesting new architectural bulletin published in conjunction with the Insulated Steel Construction Co., and illustrating an easy way to attach porcelain enamel by use of stainless steel clip-strips.

The leafflet shows illustrations of model houses built to date employing porcelain enamel exterior sheets and suitable drawings and explanations give full information on how such sheets can best be applied to the exterior of a building.

Copies of the leaflet will be mailed to contractors requesting them.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

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DETROIT ST. LOUIS CINCINNATI CLEVELAND BOSTON

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Sell the
BRUNETT PATENTED HEAT UTILIZER
The latest improvement in fuel saving—

Will Increase Your
. . . SALES
. . . PROFIT
and Will Save Your Customers 25 to 50%
of Their Fuel Costs

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"Talk About Profitable Repair Orders and Cleaning Profits with the
TORNADO
Furnace and Boiler Cleaner

"My TORNADO Furnace & Boiler Cleaner has brought me more profitable repair and replacement business than I have had in years in addition to hundreds of dollars profit on the cleaning. In our 35 years in business it is the most profitable investment we have ever made." So says the General Repair and Equipment Co., Elizabeth, N. J.

Hundreds of other TORNADO users are also cashing in on the splendid profits to be made with the TORNADO. You too can earn real money with the TORNADO. Send in at once for complete details and also for the facts proving Breuer's TORNADO to be a superior cleaner with the most complete tools (chimney cleaner if desired)—No obligation—Write us TODAY for free trial offer.

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GILTEDGE
FURNACES

We are successors to
R. J. Schwab & Sons Co.
in the manufacture and sale of all
GILTEDGE Furnaces and Repairs

For original GILTEDGE Furnaces and for Furnace Repairs for GILTEDGE, SCHWAB and SERCOMB Furnaces order from

SCHWAB FURNACE & MFG. CO.
Sales Offices: 522 West Cherry St.
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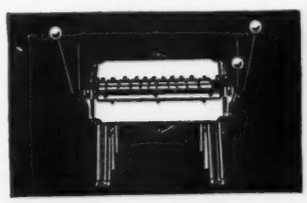
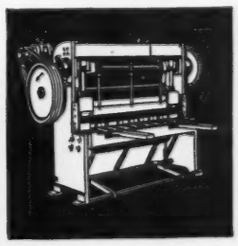
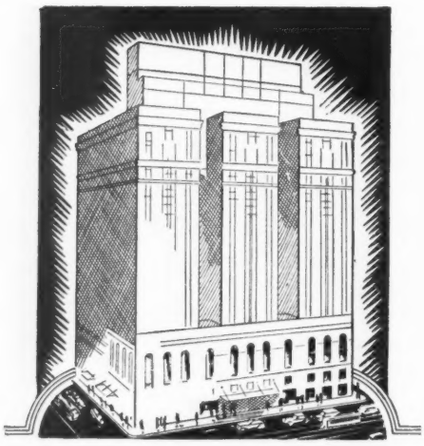




Box and Pan Brake Power Squaring Shear
STEEL BRAKES—PRESSES—SHEARS
DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

RENDEZVOUS

of PITTSBURGH'S SMART SET



Two famous restaurants, a tap room, a cafeteria, a roof garden decorated by the late Joseph Urban, the Continental Bar, the Halter and Hurdle Room, and famous dance orchestras provide a variety of opportunities for food, drink and entertainment at a wide range of prices. Rooms are cozy and elegantly furnished, rates reasonable. Centrally located, a few steps from anywhere.

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1600 ROOMS • 1600 BATHS

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Your Home When You Visit the
WORLD'S FAIR

Every comfort ~ every fine hotel luxury awaits you at the newly modernized Auditorium Hotel. Unusually good food at low rates.

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ROOMS WITHOUT PRIVATE BATH
from $2.00

ROOMS WITH PRIVATE BATH
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Hotel AUDITORIUM

MICHIGAN *at* CONGRESS CHICAGO

"In Conference"

at the

MELBOURNE HOTEL

The life blood of a business house - its sales force - seated at the conference table planning the year's campaign! They chose the Melbourne because of the secluded quiet of its conference chambers - its excellent food - its central location with the finest theatres in St. Louis within one block — and, in these days of shortened budgets because of Hotel Melbourne's mighty reasonable rates.

Your sales conference will accomplish more, at less cost, if held at the Melbourne Hotel.

400 ROOMS *all with bath* $2.50 *and more*

ON U.S. HIGHWAYS 40 AND 61

with excellent garage facilities

O. P. GREATHOUSE *Manager*

ON LINDELL BLVD. AT GRAND AVE. ST. LOUIS

HOTEL LENOX

Business Men—Tourists—World Travelers—
All come back to the Lenox. Famous for good food, homelike comforts, perfect service.

LOW RATES
Single, $2.00 to $3.00
Double, $2.50 to $5.00
Family Suites, $6.00 up

Send for Free AAA Map and Booklet

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140 North St., near Delaware

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Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?

—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

AMERICAN ARTISAN

6 North Michigan Ave. Chicago, Ill.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date.
Display rates for this page will be furnished on request.

SITUATIONS OPEN

SALESMAN — EASTERN BOILER, FURnace and air conditioning manufacturer desires salesman acquainted with the trade to travel northwestern Pennsylvania on commission basis. No objection to handling non competing lines. For particulars address Key 283, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

SITUATIONS WANTED

SITUATION WANTED — SALES ENGIneer, sales manager, production manager, branch office manager, or factory manager. Twenty-six years practical and technical experience, heavy and light sheet metal fabrication, blowers, dust collecting, ventilating, pneumatic conveying, grain handling, air engineering, etc. American, fifty, fine health, unusual initiative, energetic, strictly temperate, aggressive, dependable, mature judgment and well equipped to obtain maximum results by modern methods, with ideas that are sound and constructive. Location immaterial. Address Key 284, "American Artisan," 6 North Michigan Ave., Chicago, Ill.

SITUATION WANTED — BY AN ALL around tinner and sheet metal worker; 18 years' experience. Address Key 281, "American Artisan," 6 North Michigan Ave., Chicago, Illinois.

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MAKE SOME MONEY AND HAVE SOME fun doing it. Put on a minstrel show, play, operetta. Trade and social groups are following the idea successfully with our material—plays, operettas, musical comedies, minstrels, comedy and revue songs, blackface skits, vaudeville acts, monologs, dialogs, recitations, juvenile plays and songs, musical readings and other entertainments; make-up goods. Catalog free. T. S. Denison & Co., 623 So. Wabash. Dept. 26, Chicago.

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Manufacturers Agents

MANUFACTURERS WANTING ADditional representation often come to us for names of prospective agents now handling other lines in this field on a commission basis in a definite territory. It will pay you to be on record with us so we can refer your name to interested manufacturers. No charge or obligation, of course. It is a service we render free to manufacturer and representative. Just drop a line that you are interested in being on file and we will send you form to fill out. Address American Artisan, 6 N. Michigan Ave., Chicago, Ill.

FOR SALE

MANUFACTURE YOUR OWN TINNING Compound that tins all metals—also Combination Welding and Brazing Flux. Save Money—Buy Fisher's Guaranteed Formulas—$5.00 each. Tinning Compound—$1.75 lb. Combination Welding and Brazing Flux—$1.25 lb. F & W Manufacturing Company, 1411 Davenport Street, Omaha, Neb.

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SHEET METAL WORKING MACHINERY AND TOOLS

●

Rebuilt - Trade - In Machinery

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Angle Iron Cutters	**Grinders**
Beading Machines	**Punches**
Bending Brakes	**Shears**
Bar Folders	**Turners**
Groovers	**Rollers**

Write for Stock List

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FOR SALE: HOT DIP TINNING EQUIPment for milk and cream cans, refrigerator parts, etc. Write for prices on Hot Dip Tinning, also prices on our well known Super Re-Tinning and Soldering Flux. Retinning Mfg. Co., 3021 Greenview Avenue, Chicago. Phone Buckingham 7250.

MACHINES-TOOLS-SUPPLIES for

SHEET METALS

Have you seen the new
CHICAGO STEEL FOLDER BRAKE?
Lengths, 36'—42' Capacity 20 Ga.
Will bend heavier metal than a folder. Will bend channel bends smaller than a brake.
Investigate this machine!
Prices and details sent on request.

WARD MACHINERY CO.
564 W. Washington Blvd., Chicago, Illinois

Patents and Trade Marks
Philip V. W. Peck
Barrister Bldg., Washington, D. C.

FOR SALE

BLAST GATES

Write for Price List. Standard Sizes Carried in Stock for Immediate Shipment.

ALFRED GOETHEL
1910 N. Killian Pl., Milwaukee, Wis.

BALL JOINTS

FOR SALE—A $235 CHRISTIE PORTable Furnace Cleaner, $75. In fine condition. The fan is propelled by a ¾ h. p. motor. Lots of power. This machine has been used two seasons and am selling it as my trade will not support two cleaners. A. J. Roob, Sun Prairie, Wisconsin.

FOR SALE: SHEET METAL, PLUMBING & Radiator Shop, in connection with hardware. Will sell equipment only or both. Address Key 285, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

FOR SALE—PATTERNS ON A BOLTLESS, reversible check draft sizes 6", 7", 8", 9", 10" & 12". Address Key 280, "American Artisan," 6 North Michigan Ave., Chicago, Ill.

ESTABLISHED OIL BURNER manufacturer will sell entire capital stock of the company for $2,500.00 plus raw material and completed burners on hand, running from $2,000.00 to $3,000.00, plus $5.00 royalty per burner, all tools and patterns, and rent the factory and office for $200.00 per month, manager and employees to remain. Large margin of profit selling wholesale. Address Key 282, "American Artisan," 6 N. Michigan Ave., Chicago, Ill.

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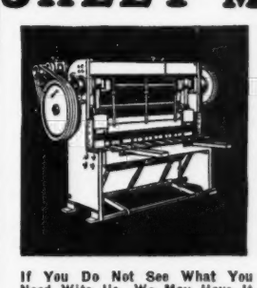
SHEET METAL MACHINERY

Draw on the MOST COMPLETE STOCK IN AMERICA
SOME REBUILT BARGAINS



Brakes, Chgo. St. Box, Pan 3' to 6'
Spot Welders, 5, 7½, 15, 25 & 35 KW
Nibblers, 3/32 and 3/16" Capacity.
Rolls, Hand, 36", 42", 48"; Power, 7' 3/16"; 10' 3/16"; 10' ½"; 8' ¾".
Rotary Shears, 18, 14 and 10 ga.
Punch Presses No. 0, 1, 2, 3, 4, 5
Kick Press No. 1 Consolidated
Seamer, Hulberts Double $25.00
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Press Brakes, 10'10; 10' 3/16"; 10' 3/16'.
Bar Folders, 20", 30", 36", 42".
Brakes, Chgo. St. 8'18; 8'16; 8'14; 10'16; 10'18; 6'18; 6'16; 4'16.
Shears, Power, 30"14; 36"18; 42"14; 8'14; 8'16; 8' 3/16"; 5' ¼"; 10' ⅛"; 8' 10 ga., 20" gap.
Shears, Foot, 30", 36", 42", 52", 96".
Angle Iron Roller 2x2x¼".
30"x2" Pexto Plain Roll.....$15.00
Comb. Punch & Shear 6x8x½".
No. 2 Whitney Hand **Punch**..$8.50
1 KVA 110 volt Spot Welder.$20.00
3 & 6 Ft. **Power Groovers.**
14 gauge **Unishear** 110 volt.

If You Do Not See What You Need Write Us—We May Have It —IN STOCK—

NEW & USED — Send for Bulletin No. 835 listing modern requirements. ROLLS — SHEARS — BRAKES — PUNCH PRESSES BUTT, ARC & SPOT WELDERS — FOLDERS PRESS BRAKES — HAND MACHINES — STAKES — **HAND & POWER**

INTERSTATE MACHINERY COMPANY
130 S. Clinton St. - - - - Chicago

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Fruits displayed at Wegman's Stores, Rochester, N. Y. Display pans and trim are of Monel Metal.

Monel Metal trimmed and lined fish cases manufactured and installed in McCann's Store, Pittsburgh, Pa. Monel Metal sinks and work tables in background.

Spice Bins, Fish Stands and Shelves for Food Stores

...*Keep Shop Irons Hot!*

FIELD IS WIDE OPEN FOR SHEET METAL MEN WHO WORK IN MONEL METAL

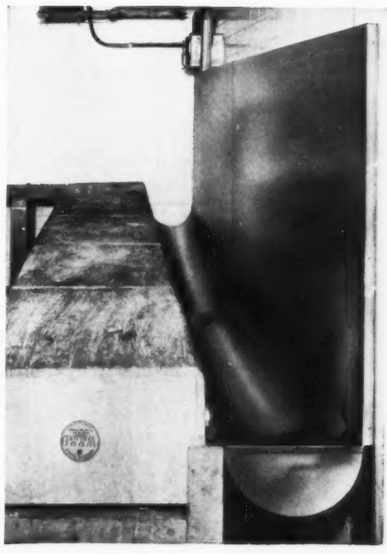
ALIVE sheet metal man need not do much head-scratching to think up fields for Monel Metal jobs.

In fact, if he just walks down the street with his eye peeled he can hardly miss seeing places where a little Monel Metal selling might bring in a very profitable order.

Take grocery stores for instance, or meat markets, or bakeries or any other kind of retail food store. *There* is a class of business that offers endless possibilities, as you'll readily see by looking at the above photos.

Tops and trim for vegetable stands, butcher block troughs, spice bin linings, counter tops, fish cleaning sinks and stands...Monel Metal's excellent fabricating qualities make it the logical material for all such equipment.

And Monel Metal offers you a sales talk that "clicks"! You can emphasize to your prospect how its gleaming silvery beauty sets off his merchandise, making it more appetizing to his customers.



(Above) *Monel Metal spice bins installed in the McKelvy Store, Youngstown, Ohio.*

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(Left) *Meat cutting and wrapping room in the Wellworth Market, 2337 Washington Street, Roxbury, Mass.*

You can remind him of Monel Metal's tough strength...how it can stand the hard blows of busy store use...how, being solid metal right through, there's no coating to chip, crack or wear off. And mention how easy it is to keep clean. Monel Metal is absolutely rustproof, highly resistant to corrosion and unharmed by harsh cleansers.

Food stores are certainly worth cultivating. There are endless numbers of them. And they bring in a steady string of jobs too...boom or slump, people have got to eat: that's why the retail food business was one of those that suffered least from the depression.

Let us send you complete information about fabricating Monel Metal; and about the sales literature we have prepared for your use in getting Monel Metal jobs.

See the INCO *Exhibit of*
MONEL METAL
Household Appliances
at A Century of Progress, Chicago, 1934
Home Planning Hall

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET, NEW YORK, N. Y.

Monel Metal is a registered trademark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

LEADTEX *scores a* TRIPLE TRIUMPH *IN PHILADELPHIA*

● Philadelphia points with pride to these three beautiful structures...enduring monuments to art, to medicine, to commerce. And they will *endure*, because all three are permanently protected against time and the elements by Revere Leadtex (lead-coated copper).

50,000 pounds of this material, that combines the architectural beauty of lead with the workability and durability of copper, went into the Philadelphia Art Museum. 10,000 pounds were used in the Lincoln Liberty Building. And 9,000 pounds in The Women's Hospital of Philadelphia.

Our hat is off to Thomas S. Gassner Co., Inc., Philadelphia, whose fine craftsmanship is a feature of all three of the buildings illustrated. The experience of this sheet metal contractor proves again that Revere Leadtex helps to get the profitable jobs... in good times or bad!

And it gets business of all types... in homes, clubs, churches, auditoriums, hotels, and public buildings. Revere Leadtex is made in several finishes for various architectural, industrial, and decorative requirements. It is ideal in its utility for roofing, flashings, and gutters... as well as in its decorative qualities for spandrels, panelings, cornices, and ornamental leaders or leaderheads.

Write for complete data on Revere Leadtex. Jobs like the above are constantly adding to its prestige as an architectural material. Put this product to work for you. Address Revere Copper and Brass Incorporated. Executive Offices, 230 Park Avenue, New York City.

● *The Women's Hospital of Philadelphia.* Architect: Zantzinger, Borie & Medary, Phila. Building Contractor: Cramp & Company. Leadtex used on main roof, also on flashings at walls.

● Sheet Metal Contractor for these three buildings: Thomas S. Gassner Co., Inc., Philadelphia.

● *Lincoln Liberty Building, Philadelphia.* Architect: John T. Windrim, Phila. Building Contractor: John N. Gill Construction Co., Phila. Leadtex used for flashing of roofs, lining of gutters, conductors, flashing of stone dome.

● *Art Museum, Philadelphia.* Architect: Horace Trumbauer & Zantzinger, Phila. Associate Architect: Borie & Medary, Phila. General Building Contractor: George A. Fuller Co., Phila. Leadtex used for gutters, eave pipes, flashing at walls and valleys.

Revere Copper *and* Brass

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